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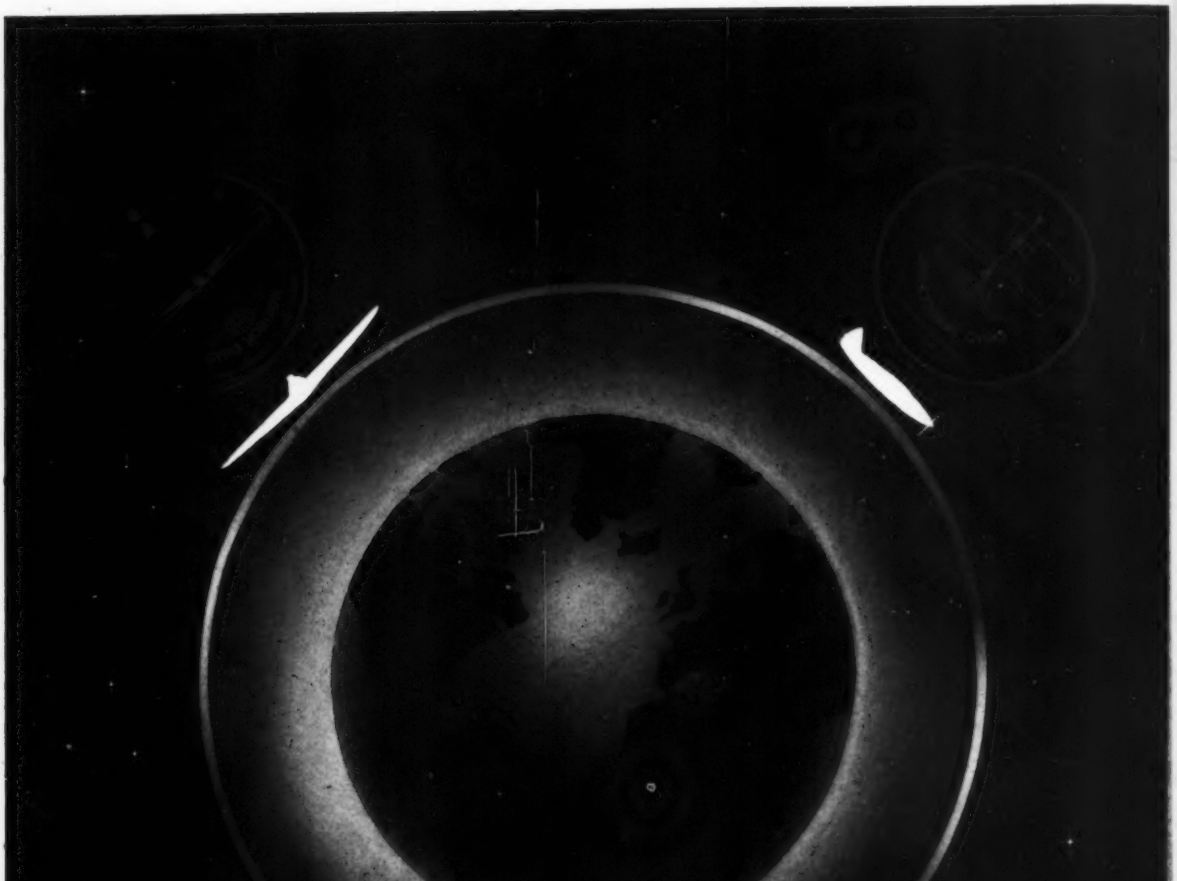
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FLIGHT and The AIRCRAFT ENGINEER

First Aeronautical Weekly in the World : Founded 1909

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The Outlook

Independent Air Action

FIELD MARSHAL SMUTS is a strategist, a statesman, and a philosopher. He has also proved himself in previous wars a good tactician, but in his Guildhall speech last week he did not deal with tactics. The part played by new or recently developed weapons in winning the great land victories of the last twelve months formed no part of his review of the world war. Strategic bombing received a tribute from him, but tactical air forces, armour, and the other most novel ingredients of the battlefield were not mentioned.

Stalingrad and El Alamein were acclaimed by the South African Premier as the two great turning points of the war in the last twelve months. "That great moment of history," he said, "is Russia's and ours." To the Russian effort he paid a glowing tribute, but he would have none of that scaling down of our own contribution to which many citizens of the Empire are all too prone. Of the Mediterranean successes he said: "I doubt whether any other service of greater importance for our final victory has been rendered in this war. No greater events have taken place in this war." It must have been quite two, or perhaps three, years ago that General Smuts (as he then was) prophesied that the decisive victory (at least so far as the British Empire was concerned) would be won in the Mediterranean area, and his forecast has now been proved right.

The British bombing offensive came in for special notice. Looking back to the situation a year ago, the Field Marshal then saw in Britain's growing superiority in the air, and especially in bombing, "the only bright spot" in a very gloomy picture. Turning to the present, he made special mention of the "vast destruction" which the bomber offensive has wrought to the enemy resources and war effort, to the immense manpower which has been directed to repair the damage and to move war industries out of the danger zone, and to the number of fighters which have had to be diverted to counter this bombing attack and have thus been kept away from the Russian front. He estimated that some two million men have had to be employed on anti-air defences and other protection, and he declared that it was no exaggeration to say that the bomber offensive had the dimensions and effects of a large-scale additional front.

Russian spokesmen have at times been inclined to cry down the British bombing effort, probably because their military doctrine does not visualise anything but land campaigns, and their air arm, which has done remarkably fine work, is regarded as mainly a form of artillery. This testimony to independent air action by so sound a judge as Field Marshal Smuts is bound to impress our friends as well as our foes.

Then and Now

THE South Coast of England and East Anglia have known no complete cessation of raiding since the second year of the war, but London had a quiet period for a long time. It has recently been broken by successive small raids on a number of nights, and they have caused some casualties which are deplored by the whole nation. Every Londoner has realised that these raids have been on an infinitely smaller scale than those of the great "blitz" of 1940-41, but perhaps not everybody has grasped how feeble has been the enemy's effort of late and, on the other hand, how slight was our own power of defence in the days of the blitz. Some figures recently made public drive the contrast home.

On July 9th last ten enemy aircraft crossed the coast by day, and dropped bombs in more than one place,

causing casualties. On October 17th four day raiders got across the coast and dropped bombs. Between those two dates there were 100 days on which no enemy machines crossed the coast by daylight. By night, however, during that period, the enemy dropped 480 tons of bombs on Britain, but no machine penetrated far inland, and the raiders lost 10 per cent. of those which ventured over the South and South-East Coasts. But in the same 100 days of 1940 no fewer than 12,000 enemy machines flew over Britain and they lost under one per cent., despite the multitude of targets which they presented to our defences. That gives a good idea of how our defences have improved—and of how much room there was for improvement!

The other side of the picture is the growth of our own offensive against the enemy. The figures for our bombing raids during the said 100 days of 1940 are not worth mentioning, but the record for the same period of the present year is impressive, to say the least of it. By day aircraft of the British Empire (excluding the operations of Coastal Command) flew 37,000 sorties and the Americans put in 2,400 more. By night Bomber Command alone dropped 48,000 tons of bombs on Germany itself (one hundred times more than the weight dropped on Britain) and a total of 56,000 tons on the whole so-called fortress of Europe. There were 72 night raids on enemy-occupied territory and 56 on Germany. In ten of these raids more than 2,000 tons at a time were dropped.

Not Much Forrarder

SO we have not really got very much farther in the way of eliciting information about the Government's policy for post-war civil aviation. It had been hoped that the debate initiated in the House of Lords by the Marquess of Londonderry would have produced something a little more definite than the replies of previous Government spokesmen, but Lord Beaverbrook managed to convey an impression of giving frank answers without actually telling us very much. This in spite of Lord Londonderry's plea: "Just tell me anything you like, but don't take me for a complete fool."

Reduced to essentials, the debate (reported elsewhere in this issue) showed that Lord Beaverbrook does not consider civil aviation a sufficiently sound basis for absorbing the capacity of the industry; that the "chosen instrument" will be with us for the duration; that complete agreement was reached at the Empire Air Conference; that the control of civil aviation will not, in any event, be removed from the Air Ministry until after the war; and that in the matter of post-war commercial aircraft Lord Beaverbrook means to follow the views of the Brabazon Committee in so far as he is required to reach a decision.

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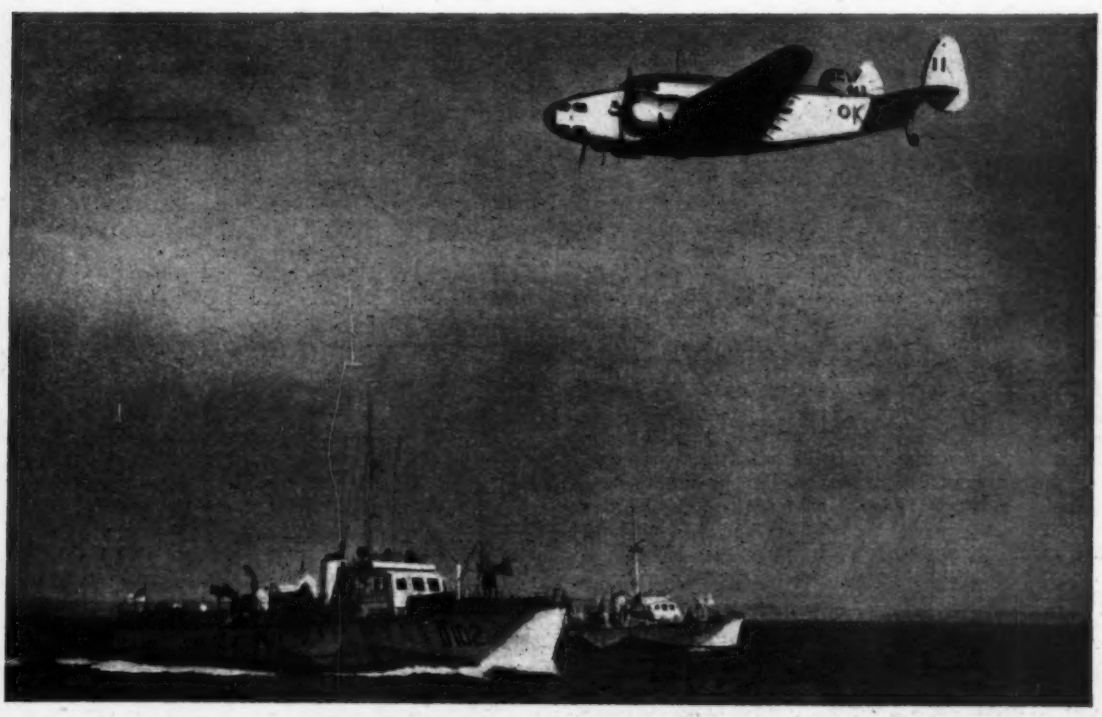
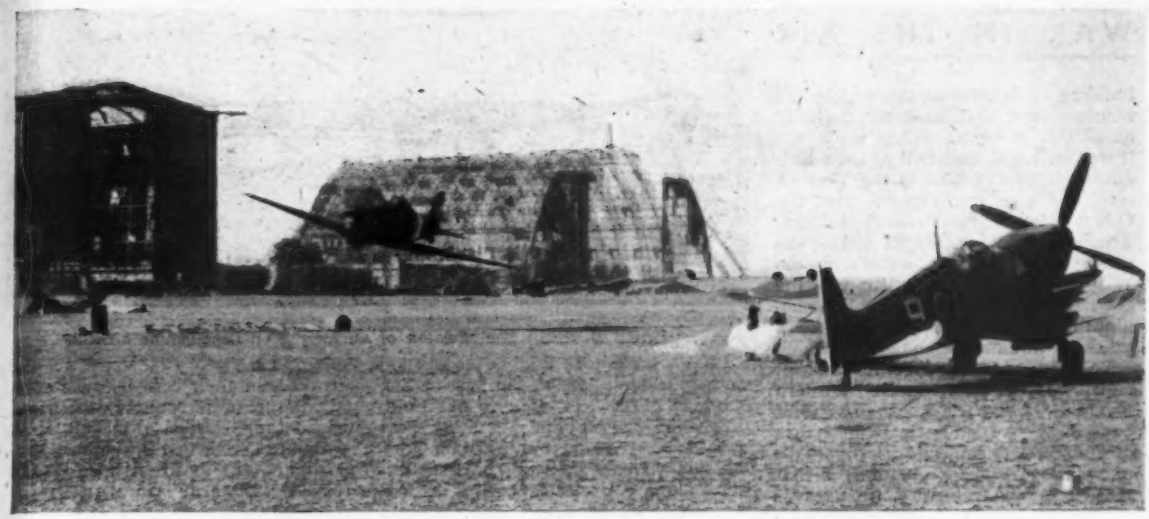


A Hudson of the R.C.A.F. passes over two Canadian Fairmile motor boats as it returns to a base in Newfoundland.



CO-BELLIGERENT : An Italian Macchi C.200 flying over an R.A.F. Spitfire station in Southern Italy.

WAR in the AIR

Pressing On in the Pacific : Chittagong Raid Intercepted : Air Tactics in Italy : Help for the Yugoslavs

GENERAL MacARTHUR has continued to press on after his great victory at Rabaul, and he sent more aircraft to complete the work of destruction there. One raid, however heavy, cannot be expected to put an air base completely out of action. That can only be done by a series of bombing attacks which make the whole place unusable, as were some of the airfields which John Yoxall saw in Sicily. Fragmentation bombs destroy many aircraft on the ground, but some will escape, and while the landing ground is in possible condition reinforcements may arrive. The airfields at Malta were a good example of how fighters could continue to use grounds which were constantly bombed, and there, too, reinforcements of Spitfires periodically arrived from carriers.

So on October 18th a force of Mitchells went back to Rabaul and destroyed 60 more Japanese machines either in the air or on the ground. They also went for shipping in the harbour and made a particularly good bag. They sank a destroyer, a gunboat, and a cargo steamer of 6,000 tons, besides leaving a corvette in flames and another freighter of 6,000 tons apparently sinking. The Japanese always have been mainly copiers, and it is interesting to see that they have now copied the British idea of the corvette. Presumably they will soon produce a frigate also, though their shipyards must be very hard put to it to keep pace in any degree with the sinkings of both warships and cargo vessels which the Americans and Australians have inflicted upon the Japanese shipping.

More enemy aircraft have been destroyed at Bougainville Island, and at the same time the Australian troops have been driving the enemy back in New Guinea. One begins to look forward to the day, which may not be so far distant, when the Japanese will have been cleared out of that large island, and also out of the Solomons group.

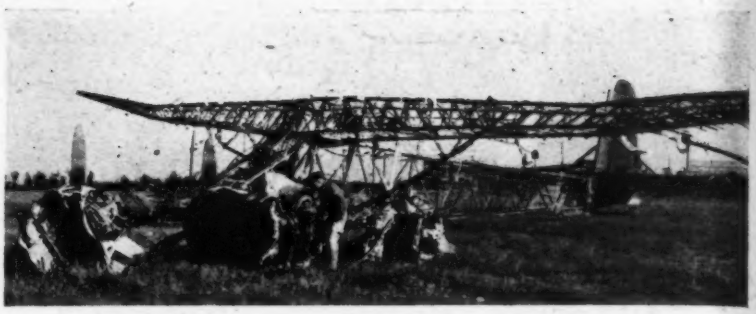
Field Marshal Göring has been set the task of getting a quart out of a pint pot. The *Luftwaffe* has not enough fighters to go round the various fronts. There has been a certain net increase by pressing on with the

LITTER CLUB INITIATES : Twenty occupants of a transport aircraft who baled out over Burma, returning to India by litter after a 26-day march.

WAR IN THE AIR

building of fighters at the expense of bombers, but that has only partially eased the problem. Some while ago it was reckoned that half of the whole fighter force was kept in the West to meet the bombing offensive and the fighter sweeps from Great Britain. The latest calculation is that two-thirds of the fighters are now in the West, less than one-fifth on the Russian front, and something like one-ninth in the Mediterranean area. That takes no account of squadrons which must be kept in Norway and Denmark, which hardly count as the Western Front. Nevertheless, their shores have to be guarded against the chance of Anglo-American raids, or perhaps of invasions. The probability is that these occupied countries are used as resting places for squadrons which have had a long period of battering in the air battles over France, the Low Countries, and Germany herself. There must also be squadrons in readiness along the Riviera coast, which is certainly part of the Mediterranean area, but is not yet an active front. As the Fifth and Eighth Armies advance farther through Italy, some reinforcement of the German fighter strength will have to be provided, and the obese Field Marshal must be scratching his head as he wonders from which of these areas it will be least damaging to draw the extra squadrons for Italy.

The raid by U.S. bombers on Regensburg and its Messerschmitt factory at the end of August reduced the output of German fighters, but there have not been many deliberate bombing raids aimed at German aircraft factories. The present shortage of German fighters has been due rather to a miscalculation on the part of the German authorities, who do not seem to have realised the numbers they would need to maintain some sort of air equality over battlefields, let alone for defence of their industrial cities. And, in addition, the vast output of Spitfires in Great Britain has come as a very unwelcome surprise to the Germans. When the Germans make a mistake it is usually of such a nature that there is no chance of rectifying it until the next war. If the Allies ever leave a loop-hole through which Germany can start a third world war, she will certainly take care to have plenty of fighter aircraft.

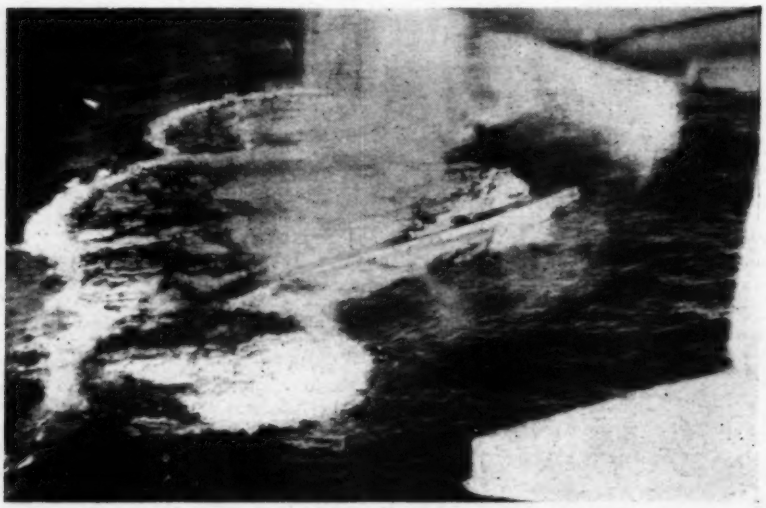


BARE BONES : The skeleton of an Me 323 on Capodichino airfield.

Tactics in Italy

LAST week was by no means a lull on the Italian front, although there were no sensational advances by the Allies to record. The battle of the Volturno finished some time ago, but the Fifth Army has had to advance slowly through marshy country, and the German defence has been stubborn everywhere. Even General Montgomery and his Eighth Army to the east were not able to make any rapid advance, in their case because of the hilly nature of the country, which again helped the Germans to stage a strong rearguard action. Still, there was hard fighting, and both Armies pushed doggedly forward.

As has always happened in the Mediterranean, and will doubtless always happen everywhere, the difficulties of the ground troops led to increased reliance on the air arm, and the Tactical Air Force was in consequence extremely busy. Fortunately, the weather did not prevent aircraft from operating. Tactics, probably one should say minor tactics, are always varying their methods, and on the front of the Eighth Army there has been a battle of wits between the German gunners and the Tactical Air Force. The special correspondent of *The Times* on that front has reported a very interesting duel of that nature. When our medium guns engaged the German batteries, the latter would cease fire, thus giving the impression that they had been silenced and that it was safe for our patrols to advance. But when our infantry moved forward the Germans opened fire again at short range. It was clever, but the answer to this trick was provided by the Desert Air Force. Fighter-bombers flew to the rescue, and on one day, in the neighbourhood of Campobasso, they silenced a concentration of 34 German guns.



ROUGH IN THE BAY : A successful attack on a U-boat by two Sunderlands in the Bay of Biscay. The photograph was taken as the second Sunderland flew through the spray from the depth charges dropped from the first aircraft.

Fortified Villages

LIKEWISE villages fortified by the enemy have had to be dealt with from the air, and one of these was recently attacked for an hour by over 100 Allied machines, Bostons bombing from a high level, Kittyhawks dive-bombing, and Kittybombers attacking from roof level, while Spitfires mounted guard up above. There was no air opposition from the enemy, an ammunition dump was exploded, and the village was demolished.

In the meantime bombers of longer range continued to attack enemy communications and airfields, mainly round about Rome. Others have crossed the Adriatic to give help to the gallant Yugoslav patriots. The railway junction at Nish was well cratered by Mitchells, and their escort of Lightnings had nothing to do in

WAR IN THE AIR

ENEMY AIR LOSSES TO OCT. 23rd

	Over G.B.	Continent	Middle East	N.W. Africa
Oct. 17	3	0	0	0
,, 18	0	5	3	0
,, 19	0	0	2	1
,, 20	1	13	0	0
,, 21	2	0	1	12
,, 22	0	15	0	5
,, 23	1	2	0	8
	7	35	6	26

Totals: West, 7,660; Middle East, over 5,730; North West Africa, 3,471.

the way of protecting the bombers. On all sides the shortage of German fighters is very evident. The Yugoslavs, who had for so long fought on their own with the minimum of help from outside, must be full of rejoicing at seeing Allied aircraft overhead.

Admiral Lord Louis Mountbatten recently flew to Chunking to confer with Generalissimo Chiang Kai-Shek.

The Japanese recently sent a formation of bombers to raid Chittagong, but it was intercepted by Allied fighters, and most of the bombs fell harmlessly into the river. Several enemy aircraft were probably destroyed and others damaged, while the Allies lost only two pilots and three machines.

H.M.S. *Victorious*

NOT long ago a carrier of the United States Navy took a prominent part in an attack by the Home Fleet on the Germans in Norway. It has now been learnt that even before that the British carrier, H.M.S. *Victorious*, had been lent for a term to the United States Pacific Fleet. If Hitler hopes, as many believe that he does, to bring about a stalemate by fostering dissensions among the Allies, these examples of how the two great Navies of the United States and the United Kingdom can work as one must be profoundly discouraging to him.

Not only did the Americans in the Pacific make everything as easy and pleasant as possible for the *Victorious*, but they gave Captain Lachlan Mackintosh, D.S.O., D.S.C., full advantage of his rank. For one considerable period he commanded a group of the U.S. Pacific Fleet, which included an American battleship. Soon after the end of that cruise the Captain of the battleship was promoted to Rear Admiral.

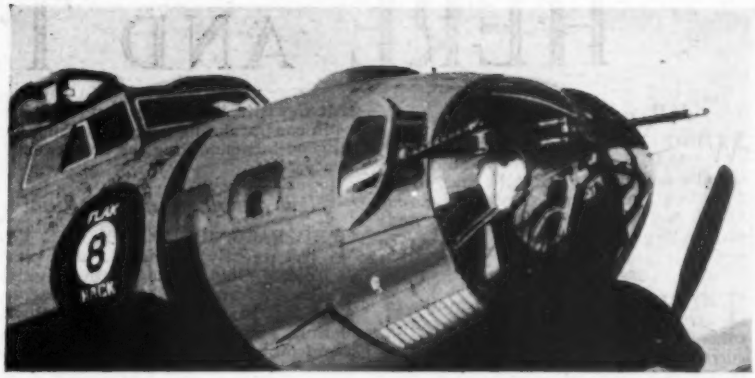
The ship's company of the *Victorious* learnt the American methods of working carriers, and the American sailors also studied British methods. An American deck control officer came on board the *Victorious*, and soon won the complete confidence of the British pilots, besides becoming an extremely popular person in the wardroom. As the lives of pilots and air crews depend on the deck control officer, who has to bring them safely home after a flight, the high opinion won by this American officer speaks volumes for the methods evolved by our Allies.

For tactical reasons it was found desirable to exchange squadrons with an American carrier, and so a squadron of torpedo-bombers left the *Victorious* and landed on the deck of the U.S. vessel, while simultaneously a fighter squadron from the American carrier landed on the *Victorious*. In both cases hosts and visitors enjoyed their experience, and many warm friendships were made. Maintenance men were not transferred, and the crews of the British T.B. Squadron were delighted at the way in which the American mechanics looked after their machines.

That the observers of American Naval Aviation (which is the official term on the other side for what we call the Fleet Air Arm) are very good was proved by an unusual incident. While the *Victorious* was steaming from the Panama Canal (she was one of the largest British ships that have ever passed through the Canal) to Pearl Harbour, a case of diphtheria developed, and all the serum on board as well as on the accompanying destroyers was used up. After midnight one night a wireless request for more was sent out to Balboa. Next day, at 5 p.m., a Liberator found the *Victorious*, which was then 1,300 miles away from the Canal, and dropped the serum near a destroyer, which picked it up.

Many Fleet Air Arm pilots are now trained up to operational standard in flying schools in America, and there is a F.A.A. section, staffed by R.N. officers, in the Bureau of Aeronautics of the Navy Department in Washington.

The raiding of Germany and occupied territory has gone on by day and night, and heavy damage has been done to the enemy.



FOR HEAD-ON ATTACKS: The .5in. side machine guns in the noses of U.S.A.A.F. Fortresses are now fitted in new gimbal mountings to increase their field of fire.

BRITISH & U.S. AIR LOSSES TO OCT. 23rd

	Over G.B. A'crft.	Continent B'brs.	Continent F'trs.	Middle East A'crft.	N.W. Africa A'crft.
Oct.					
17	0	0	0	0	3
18	0	17	2	1	1
19	0	1	0	1	0
20	0	25	2	1	3
21	0	0	0	0	1
22	0	44	9	0	1
23	0	0	0	0	2
	0	87	13	3	11

Totals: West, 8,228; Middle East, about 2,292; North West Africa, 1,303.

IN THE FLEET AIR ARM: The Royal Navy are now using the Vought-Sikorsky F4U-1 Corsair fighter. It is powered by a Pratt and Whitney Double Wasp engine giving 1,850 h.p. for take-off. Span 40ft. Length 30ft.

HERE AND THERE

M.P. as Liaison Officer

WING CDR. N. J. HULBERT, M.P., who has served in an operational command of the R.A.F. since 1939, has been appointed British Liaison Officer to the Polish naval, military and air forces in this country.

Loss of Air Mails

THE Postmaster-General regrets to announce the loss, through causes other than enemy action, of air mail correspondence for the United Kingdom, posted in Ceylon on August 1st and 2nd, 1943.

Lord Knollys on A.R.B.

THE Air Registration Board announces that the Viscount Knollys, K.C.M.G., D.F.C., chairman of British Overseas Airways Corporation, has been nominated to the Board. His particular function will be to watch the interests of aircraft operators.

New Russian Air Rank

A NUMBER of new ranks has been instituted by the Presidium of the Supreme Soviet of the U.S.S.R., for the higher commanding personnel of the Red Army.

Among these is Chief Marshal of Aviation, which, it would appear, is more or less equivalent to that of Marshal of the Royal Air Force.

Twenty-five Years with R.Ae.S.

THIS month Miss Barwood completes twenty-five years with the Royal Aeronautical Society, during most of which time she has been assistant to Capt. J. L. Pritchard, the secretary of the society.

Many are the people in the British aircraft industry who have found in Miss Barwood an excellent guide, counsellor and friend. We on *Flight* owe much to her unfailing and cheerful assistance on innumerable occasions, and we feel sure that the British aviation world will join us in congratulating her and wishing her all good fortune during the next twenty-five years.

New American Merlin Plant

THE PACKARD MOTOR CAR CO. has recently acquired a new plant in Toledo, Ohio. The Toledo Division of the Packard Co. will manufacture parts for the Packard-built Rolls-Royce Merlin. Some indication of size is afforded by the statement that the annual wages bill will be ten million dollars.

A.V-M. Stedman's Appointment

AIR VICE-MARSHAL E. W. STEDMAN, director of general air research for the R.C.A.F. at Ottawa, has now been appointed a member of the council of the Institute of Civil Engineers for the coming year, and by virtue of this office becomes chairman of the council's advisory committee in Canada.

Having served in the R.N.A.S. and R.A.F. from 1914 to 1919, A.V-M. Stedman joined Handley Page, Ltd., after demobilisation, and became chief of their technical staff. He has been associated with the R.C.A.F. ever since its inception in 1924.

Relative Importance

COMMENTING upon the loss of 60 Flying Fortresses in the raid on Schweinfurt, General Arnold, the U.S. Air Chief, has stated that their air forces based in Britain are prepared to face a 25 per cent. loss in order to destroy a sufficiently important enemy target.

Such a loss, he points out, is more worth while than a five per cent. loss on five successive days in attacks on less important targets.

"Regardless of our losses," he added, "I am ready to send replacements of aircraft and crews and continue building up our strength. The opposition isn't nearly what it was and we are wearing them down."

The air war, he believed, was bringing a sense of hopelessness to the German people, and Germany realised that if she could not stop our long-range bombers she was doomed.

The U.S. answer to the Schweinfurt loss was that the striking power of their air attacks on Germany from Britain, Italy and the Mediterranean will be trebled within the next five months.

BIRDS' NEST: Wrens, in sole charge of an F.A.A. satellite airfield in the West Country, checking height and angle during dive-bombing exercises.

Firestone in Helicopter Field

FROM America it is reported that Firestone Aircraft Co., a subsidiary of the Firestone Tire and Rubber Co., has acquired G. and A. Aircraft, Inc., of Willow Grove, Pa. G. and A. were owned by the Pitcairn Autogiro Co. Manufacturing facilities will be greatly extended under the new organisation, it is understood.

Internal Australian Lines

PLANS for linking all the smaller towns in Australia are now being considered by the Australian Civil Aviation Department. The intention is that there should be airports and airfields every 150 to 300 miles so that feeder-line services may link up with the main routes. Mr. Drakeford, Australian Air Minister, referred to the fact that one of the large British bombers already had a passenger replica (he was obviously referring to the Avro York), and that it was being examined for its suitability for Australian conditions.

Supply and Demand

CONTRACTS for Curtiss C-76 Caravans have been cancelled by the American War Department. At the same time, orders for the Curtiss C-46 Commando have been increased. It appears that at the time the Caravans were ordered there was a scarcity of certain light metals (the Caravan is of wood construction). Now the production of aluminium has been greatly increased, while at the same time there is a shortage of certain kinds of wood. Consequently the all-metal Commando is considered preferable. An interesting comment is that the all-wood Caravan was more expensive and less efficient than the all-metal "ships."

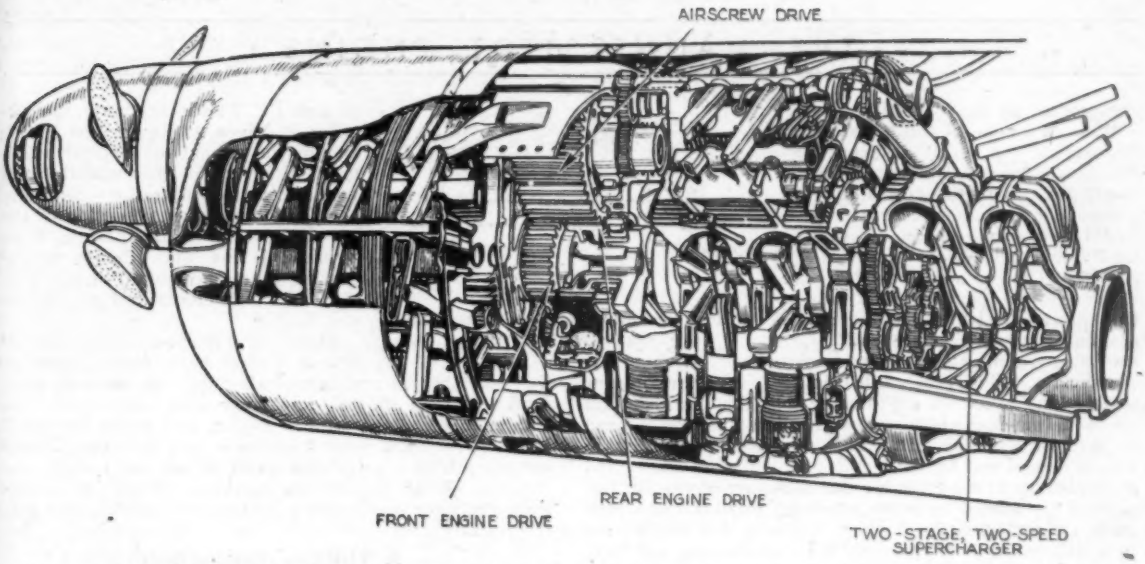
Empire Air Policy

AGREEMENT on certain general principles governing the relation of civil aviation to world peace and the integration of the efforts of the British Empire were reached during the London conference over which Lord Beaverbrook presided.

This was revealed by Mr. C. D. Howe, Canadian Minister of Munitions and Supply, who attended the conference with other representatives of the Dominions and India.

For the moment it was not intended to enter into discussion with the United States with any cut-and-dried Empire policy, but proposals for a great conference between all the countries interested in post-war civil aviation would be advanced without delay, and it might take place before the war ended.

Canada, Mr. Howe said, was well qualified to make a substantial contribution to post-war Empire aviation. The Dominion was in a favourable geographical position, had a well developed line of airfields from the American boundary to Alaska, and even before the war had a chain of airports from the Atlantic to the Pacific. Since the war began another 125 modern airfields had been added.



This part-sectioned view of the Mannerstedt engine, drawn by Sixten Sason, shows the main features and the central airscrew drive. Each unit comprises three 7-cyl. radial engines.

The Mannerstedt Engine

An Unorthodox Swedish Multi-row 42-cyl. Radial : Central Drives and Ingenious Valve Operation

REFERENCE has been made previously in this journal to the difficulties that beset a small country which finds itself suddenly deprived of the supply of aircraft and engines hitherto obtained from abroad. In our issue of August 26th, 1943, we published an illustrated description of the new Swedish J22 single-engined, single-seater fighter, designed by the Swedish aircraft engineer Bo Lundberg. This aircraft has made Sweden independent so far as fighters are concerned. She also has a bomber type of Swedish design, but hitherto the engine question has remained unsolved.

It now appears that in the matter of engines also Sweden may in time become self-supporting. The production of a new aircraft engine is not an undertaking to be tackled lightly. Even firms with very long experience have to allow several years for development work, and it is not really until an engine has been in actual service for a year or so that one can be sure that all the "bugs" have been removed.

Sweden has, of course, built large numbers of aircraft engines. For many years Bristol engines were manufactured there under licence, but engines of Swedish design have not been built since the early days of flying. Now, however, a Swedish engineer has tackled the problem, and the following notes and pictures, for which we are indebted to our Swedish contemporary *Flyg*, of Stockholm, indicate that he has gone to his difficult task with boldness and imagination. Herr Folke Mannerstedt will probably not be known to many in the British aviation world. his career having been connected with motor cycles. The name Husqvarna was familiar on the Continent in the years before the war, chiefly in connection with Grand Prix motor cycle races. Mr. Mannerstedt was the designer of the Husqvarna motor cycles, so he went to the task of designing an aircraft engine with long experience in getting maximum power for low weight and small size.

DESIGNED by Herr Folke Mannerstedt, who is the chief designer of the famous Swedish Husqvarna motor cycles, the M engine described in this article has many unusual features. It is divided by the airscrew reduction gear into a front and a rear unit. Each of these comprises three 7-cyl. radial engines placed one behind the other.

In his article in *Flyg* Mr. Mannerstedt goes fully into the reasons which led him to choose the somewhat unorthodox layout adopted. We have not the space to reproduce these fully but must content ourselves with selecting a few.

Aircraft designers appear to ask for the engine of 2,500 h.p., and the general tendency is seen everywhere to be towards increased number of cylinders, increased revolutions, and reduced cylinder dimensions, all these being dictated by considerations of aerodynamic efficiency. By way of examples Mr. Mannerstedt quotes the Rolls-Royce Vulture and Napier Sabre engines, as well as the double Daimler-Benz 24-cyl. type, which is virtually two DB 601s geared together.

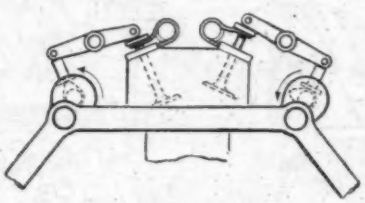
In the M engine Mr. Mannerstedt has chosen air cooling, and the engine is probably to be regarded as a double multi-bank radial, the two halves of the engine being separated by the airscrew reduction gearing. This, Mr. Mannerstedt says, was done in order to obtain improved cooling, but certain other advantages follow. For example, torsion in the crankshaft is reduced by the fact that the drive is taken from the centre instead of from one end of a long engine. Manufacture of the crankshafts is also facilitated. The front and rear units, each comprising three 7-cyl. radials, one behind the other, is geared to the airscrew shaft, which lies above the crankcases. The shaft itself is of large diameter in order to provide room for a 20 mm. or even possibly a 37 mm. cannon. The cylinders are at an angle of 50 deg. except for those on each side of the top centre line, which are at 60 deg. in order to give room for the hollow airscrew shaft. To transmit the large power gears of 130 mm. (5¼in.) width are necessary. The splitting of the engine reduces this to half, so that malalignment and imperfect

D

THE MANNERSTEDT ENGINE

engagement of the gears is avoided.

With an engine of this type of layout one of the great problems, Mr. Mannerstedt writes, is the drive for the camshafts. With the normal type of transmission innumerable gear wheels would be needed. In the M engine a totally different system has been employed. The airscrew reduction gear also drives one camshaft, and this in turn drives the other six. The diagrammatic sketch (p. 471) will make the arrangement clear. The driving camshaft is divided, each half being geared to the airscrew shaft. The other six are driven from this camshaft via an oscillating ring which engages a small crank on the end of each driven camshaft. This ring oscillates bodily in a path determined by the length of the driving crank, and as the cranks of the other six camshafts are identical, they in turn are caused to rotate. Special provision has been made for compensating for any distortion that might arise from differences in temperature between the ring and camshaft housings.



How the valves of the Mannerstedt engine are operated.

The cylinders are secured by long holding-down bolts, the nuts of which are readily accessible. There are two sparking plugs per cylinder, inclined at an angle of 30 deg. to the cylinder axis. The exhaust valves are sodium cooled and have stellited seats.

Cooling is effected in the orthodox way by the speed of the air over the cylinders. A fairly elaborate system of baffles and ducts guides the air over the backs of the cylinders, and the considerable space between the front and rear units of the engine facilitates adequate cooling of the cylinders of the rear unit.

The Supercharger

The supercharger is of the two-speed, two-stage type, with inter-cooler. The change from the lower to the higher blower gear ratio is brought about by bringing a brake drum to a standstill. The action is described by Mr. Mannerstedt as follows (see sketch of supercharger drive): By means of the gear wheel A, which is situated direct on the crankshaft, the gear B is driven at approximately twice the speed of the crankshaft. On the same shaft as B fixed to the large internal gear C, which in turn drives the central gear E via the planet gear D. Thus E is further geared up several times.

The base on which the planet wheels D have their bearings is formed as a large gear wheel F, which engages with a small gear G located on the spindle P, on which is mounted the brake drum H. The common spindle is concentric with the centre line of the crankshaft and connected to it by a freewheel arrangement. When the brake drum H is locked, obviously the gear G and the base H are brought to a standstill, and the drive functions normally. The freewheel I releases the spindle P so that it can be kept stationary by the brake drum and not be driven by the crankshaft.

If the brake drum H is released it will tend to rotate while the plant gear D would cause the base wheel F to rotate in the same direction as C, which was prevented by locking the brake drum H. Now when this is released, it will rotate, and it would reach extremely high speeds if it were not for the freewheel I. This is prevented by the fact that the speed of the spindle P is the same as that of the crankshaft. Since the base wheel F rotates with C, the speed of gear E is reduced. E is connected direct to the impeller. Thus two speeds of the impeller is obtained, the high speed by locking the brake drum, the low speed by releasing the brake drum.

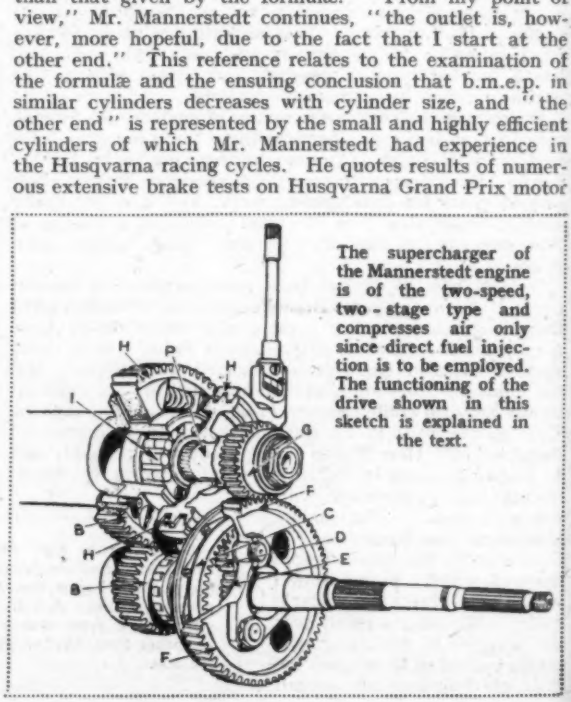
By suitable choice of the sizes of gears G and F, the G can in the one case be held stationary and in the other be driven at a speed of, for example, 20 per cent. of the speed of gear C. In the first case the impeller is driven at its greatest speed, and in the second at a speed which may be in the neighbourhood of 20 per cent. below the former. Since the base only rotates at a fraction of the speed of the gear, the braking force required is low and, thanks to the gearing up of the brake drum in relation to F, the force and the weight can be low.

Since the intention is that the M engine should have direct injection, the supercharger compresses air only. As already mentioned, it is of the two-stage type with inter-cooler. At maximum speed the ratio is 5.85: 1, and at the low speed it is 4.70: 1. The rotor diameter is 33.3 cm. (13in.) which corresponds to a peripheral speed of 360 m. (1,180ft.) per sec. and 288 m. (945ft.) per sec. respectively. The corresponding rotor speeds are 21,000 r.p.m. and 16,800 r.p.m. respectively.

A Vulture Comparison

By way of comparison may be quoted the Rolls-Royce Vulture of 2,000 h.p., which has a rotor diameter of 305 mm. (12in.) and a speed of 23,000 r.p.m. in top gear. In single-stage blowers peripheral speeds of up to 420 m. (1,375ft.) per second are used, in spite of the fact that by so doing the speed of sound is exceeded. It is proposed to leave the design of the supercharger to specialists in this particular field, but calculations based on the latest available information indicate that it should be possible to give maximum engine power at 10,000 m. (33,000ft.) and ground-level induction pressure up to 13,000 m. (42,000ft.).

Mr. Mannerstedt then refers at considerable length to the relationship between b.m.e.p. and cylinder diameter. Formulæ such as Professor Callender's of 1907 and the Horse Power Ratings Committee Report of 1911 are not encouraging, but he draws comfort from the fact that in the Napier Dagger the actual b.m.e.p. is considerably higher than that given by the formulæ. "From my point of view," Mr. Mannerstedt continues, "the outlet is, however, more hopeful, due to the fact that I start at the other end." This reference relates to the examination of the formulæ and the ensuing conclusion that b.m.e.p. in similar cylinders decreases with cylinder size, and "the other end" is represented by the small and highly efficient cylinders of which Mr. Mannerstedt had experience in the Husqvarna racing cycles. He quotes results of numerous extensive brake tests on Husqvarna Grand Prix motor



The supercharger of the Mannerstedt engine is of the two-speed, two-stage type and compresses air only since direct fuel injection is to be employed. The functioning of the drive shown in this sketch is explained in the text.

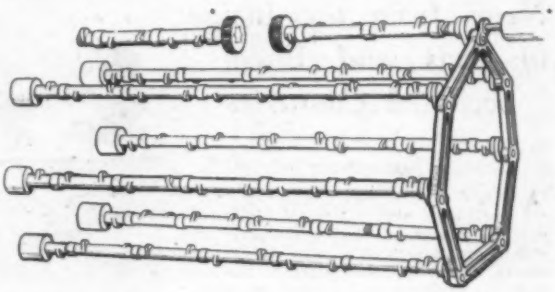
cycle engines; these gave 23 h.p. for a cylinder capacity of 0.25 litre at 6,000 r.p.m., and using a fuel composed of a 50-50 mixture of petrol and benzol, viz., of 80 octane number. Endurance tests lasting up to two hours were run.

The Husqvarna figures obtained represented a b.m.e.p. of 12.5 kg./cm.² (178 lb./sq. in.), and if that figure is inserted in the formulæ the value of k becomes 23.1 instead of 15.1, a very different result.

Main Data of the Mannerstedt M Engine

Bore	110 mm. (4.33in.).
Stroke	110 mm. (4.33in.).
Frontal Area	0.7 m². (7.5 sq. ft.).
Length o.a.	1.9 m. (6.25ft.).
Max. Diameter	950 mm. (37.4in.).
Capacity of 1 cyl.	1.04 litres (63.5 cu. in.).
Total capacity	44 litres (2,685 cu. in.).
Weight (estimated)	950 kg. (2,100 lb.).

By taking the Husqvarna cylinder as a model and scaling it up, similar results should be obtainable. The improvement in b.m.e.p. due to size (according to the British formulæ) should then bring the value up to 16.8 kg/cm.² (239 lb./sq. in.). Considerations of other factors, such as engine speed, heat transference due to cylinder wall thickness, etc., gas velocities and piston speeds, conclude Mr. Mannerstedt's arguments in defence of his unorthodox design. He comes to the conclusion that the M engine should develop 2,500 b.h.p. for a capacity of 44 litres.



Six of the seven camshafts of the Mannerstedt engine are driven by an oscillating ring operated by cranks on the remaining camshaft, which is in turn driven from the air-screw shaft.

V.C. for the R.A.A.F.

The King has been graciously pleased to confer the Victoria Cross on Flt. Lt. William Ellis Newton, No. 22 (R.A.A.F.) Squadron, in recognition of Most Conspicious Bravery.

FLT. LT. NEWTON served with No. 22 Squadron, Royal Australian Air Force, in New Guinea from May, 1942, to March, 1943, and completed 52 operational sorties. Throughout his operational career he displayed great courage and an iron determination to inflict the utmost damage on the enemy. His splendid offensive flying and fighting were attended with brilliant success. Disdaining evasive tactics when under the heaviest fire, he always went straight to his objectives. He carried out many daring machine-gun attacks on enemy positions involving low flying over long distances in the face of continuous fire at point-blank range. On three occasions he dived through intense anti-aircraft fire to release his bombs on important targets on the Salamaua Isthmus. On one of these occasions his starboard engine failed over the target, but he succeeded in flying back to an airfield 160 miles away.

When leading an attack on an objective on March 16th, 1943, he dived through intense and accurate shell fire, and his aircraft was hit repeatedly. Nevertheless, he held to his course and bombed his target from a low level. The attack resulted in the destruction of many buildings and dumps, including two 40,000-gallon fuel installations. Although his aircraft was crippled, with fuselage and wing sections torn, petrol tanks pierced, main planes and engines seriously damaged, and one of the main tyres flat, Flt. Lt. Newton managed to fly it back to base and make a successful landing.

Despite this harassing experience, he returned next day to the same locality. His target, this time a single building, was even more difficult, but he again attacked with his usual courage and resolution, flying a steady course through a barrage of fire. He scored a hit on the building, but at the same moment his aircraft burst into flames.

Flt. Lt. Newton maintained control and calmly turned his aircraft away and flew along the shore. He saw it as his duty to keep the aircraft in the air as long as he could so as to take his crew as far away as possible from the enemy's positions. With great skill he brought his blazing aircraft down on the water. Two members of the crew were able to extricate themselves and were seen swimming to the shore, but the gallant pilot is missing. According to other air crews who witnessed the occurrence his escape-hatch was not opened and his dinghy was not inflated. Without regard to his own safety, he had done all that man could do to prevent his crew from falling into enemy hands.

Flt. Lt. Newton's many examples of conspicuous bravery have rarely been equalled, and will serve as a shining inspiration to all who follow him.

Flt. Lt. Newton was born at St. Kilda, Victoria, in 1919, and was educated at Melbourne Grammar School. He was at one time a member of the Victoria State 2nd Cricket XI.

On the outbreak of war he was one of the first to apply for enlistment in the Royal Australian Air Force. Called for interviewing in October, 1939, he was commissioned in 1940, and subsequently went into action against the Japanese in New Guinea.

AN AIR LEAGUE APPOINTMENT

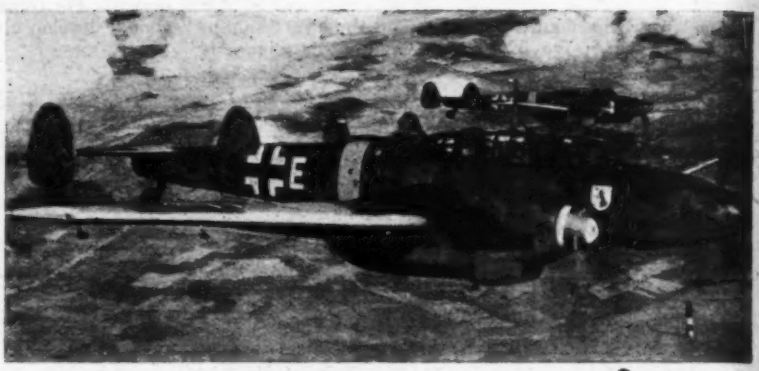
WITH effect from January 1st, 1944, Mr. E. Colston Shepherd will become Secretary-General of the Air League of the British Empire. The growing work of the Air League has rendered such an appointment desirable, and Mr. Leonard Taylor, the present Secretary, will then be free to devote all his time to the editorship of the *A.T.C. Gazette*, a post which has combined with the secretaryship since the inception of that journal.

It will scarcely be necessary for us to recall to our readers that Mr. Shepherd was until recently editor of our contemporary, *The Aeroplane*. Previously he had been on the editorial staff of *The Times* for seventeen years, the last ten as aeronautical correspondent. Mr. Shepherd, it may be remembered, covered the Houston Mount Everest flights in 1933 by going out to India with the expedition.

Although Mr. Shepherd does not take up his duties until the New Year, correspondence may be addressed to him at the Air League, Kinnaird House, 1A, Pall Mall East, London, S.W.1.

Behind the Lines

Service and Industrial News from the Inside of Axis and Enemy-occupied Countries



ANOTHER MESSERSCHMITT : A new version of the Me 110 in flight. Note the map of the British Isles which the nearest aircraft bears on its fuselage.

Newcomer

A NEW company in the German aircraft industry is the Böhler Fertigungs-G.m.b.H. of Berlin, which is engaged on the manufacture of instruments, accessories, and parts for the aircraft, automotive and armament industries.

German Statistics

FIELD MARSHAL of the *Luftwaffe* Milch was quoted by the German News Agency as saying that during the past year the *Luftwaffe* had dropped 35,000,000 bombs.

He said the Air Force had also shot up 61,000 enemy aircraft, and damaged 12,900,000 tons of shipping.

Thus Spoke Junkers

SPEAKING on the German Home Service, Colonel of the *Luftwaffe* Junkers says, "One must not imagine that it is not difficult or dangerous to attack giant U.S. bombers, flying in close formation and defending themselves with hundreds of machine guns. To-day German fighter pilots have the best aircraft in the world for fighting bombers. But above all, their dashing spirit of attack is the secret of their success. Many of them have a personal account to square with the enemy."

"The question which concerns us most," continued Colonel Junkers, "is whether it may be possible to stop the terror attacks completely one day. There is no magic gadget for fetching enemy bombers down from the skies—there is only hard fighting. But nobody can afford to lose more bombers than he can build or more personnel than can be trained."

Luftwaffe News

LT. ELIMAR MEYER who, together with the leader of the Duce-Salvage expedition, Skorzeny, was the first to land on the Gran-Sasso, has been awarded the Knights' Insignia to the Iron Cross. Previously an instructor in the N.S.F.K., he took part in the Crete operation and is at present serving with an airborne unit (*Luftlandegeschwader*).

Among *Luftwaffe* aces mentioned in recent German communiqués, Captain Walter Nowotny is quoted as "the most successful fighter pilot officially credited with 250 air victories." Nowotny has been awarded by Hitler the highest German military honour, the Oak Leaves with Swords and Diamonds to the Knights' Insignia of the Iron Cross. Major Doerfller, a Group Commander in a ground attack aircraft unit, decorated with the Oak Leaves Insignia, is reported to have completed his 1,000th operational flight. The official source crediting him with thirty air victories remarks that "this is an uncommonly high figure for ground attack aircraft." Lt. Heinz-Berres, *Staffelkapitaen* in a fighter squadron, is credited with forty-four air victories in the Mediterranean war zone, and on the Russian front Lt. Hans Krumminger, 23, who received the Knights' Insignia to the Iron Cross, is said to be the most successful Stuka pilot. N.C.O. Heinz Vinke, 23, awarded the same decoration, is said to be the leading night-fighter pilot, and is credited with 27 victories, including 17 four-engined bombers.

Finally, a Berlin message says that Lieut. Berthold Kortz, a fighter ace credited with 113 aircraft, has been killed in action against Soviet fighters.

First close-up of the above-shown modified Me 110 twin-engined long range fighter and "destroyer" on which the former installation of four MG's has been replaced by cannons. The two 20mm. cannons in the bottom of the fuselage nose and structural details are the same as in the old version.

Ex-Duce's Orders

FOLLOWING the call-up order issued by Lt.-Col. Grotto, Under-Secretary for Air in Mussolini's pseudo-cabinet, Rome Radio announces that all Air Force officers living in "the open city of Rome" and South of it should report at the assembly centre at the *Scuola di Applicazione* in Florence. Reporting centres at Milan, Turin, Padova, have also been established and all parachutists are being called up and asked to proceed with their equipment to various assembly points.

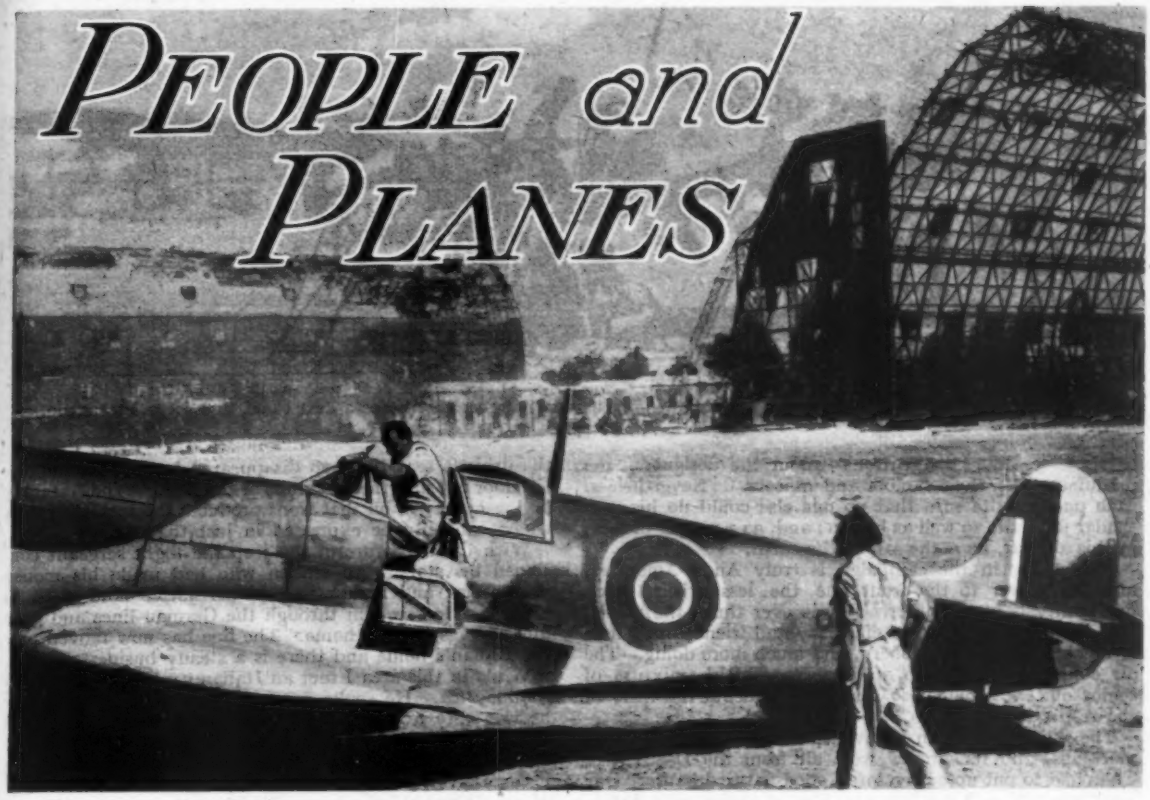
Shortage of Skill

AN official German statement reveals the existence of a serious shortage of aeronautical engineers which is to be remedied by rapid, theoretically limited courses for suitable young men. By the order of the Government the College of Aeronautical Engineering (*Ingenieurschule fuer Luftfahrttechnik*) is organising special courses for re-training skilled mechanics as aeronautical war production, development and research engineers. Preference in admittance to these courses, which will last only six or seven half-terms, will be given to men invalided out of the army.

Budapest Prepares

THE Hungarian official gazette published a decree by the Ministry of National Defence reorganising the activity of the A.R.P. League. A general fire-watching system is being established, grouped into centres and house blocks, each under a trained A.R.P. chief.

PEOPLE and PLANES



Pen Pictures of the High Command: High Spirits at the Battle Front: Aircraft in Mobile Warfare

By JOHN YOXALL

(Above) Air Vice-Marshal H. Broadhurst getting into his Spitfire on a captured Italian airfield near Taranto. (Right) The Mediterranean Air Officer Commanding-in-Chief, Air Chief Marshal Sir Arthur Tedder.

IN this article, the second of the series, our representative tells, among other things, of the high spirits which pervade our front line atmosphere. He feels that the victory over the Luftwaffe is being turned to good account by easing oppressive blackout and headlight restrictions. This, in its turn, brings an elevation of feeling and raising of morale. There seems to be in this a lesson for this country, where we are still persisting in an "invasion" and "take cover" outlook. There is, in fact, too little realisation that we are winning the war.

WHEN dealing with personalities it is always difficult to make up one's mind with whom to start, but in this case the problem was solved by Air Chief Marshal Sir Arthur Tedder's very forceful reminder to pay particular attention to the work of the ground crews. They can, I think, be given a collective personality. Theirs is a most exacting job: all the beautiful and intricate machinery of modern aircraft to be kept in perfect order in conditions which have nothing between sand and dust or ankle-deep mud, and never the protection of a hangar for months on end. Point is given to this trouble by an incident which occurred on one of the base airfields in North Africa. There were rows and rows of Spitfires standing there, all looking as if they were derelict. Someone was heard to ask where this graveyard came from. He was very surprised when informed that they were all brand-new machines which had just been uncrated and were then awaiting delivery to the squadrons. What had happened was that in the short space of time they had been there

MEDITERRANEAN AIR COMMAND
AIR CHIEF MARSHAL SIR ARTHUR TEDDER
NORTH AFRICAN AIR FORCES
GENERAL CARL SPAATZ
AIR HEADQUARTERS, MALTA
AIR VICE MARSHAL SIR KEITH PARK
MIDDLE EAST COMMAND
AIR CHIEF MARSHAL SIR W SHOLTO DOUGLAS
STRATEGIC AIR FORCE
GENERAL J. H. DOOLITTLE
TACTICAL AIR FORCE
AIR MARSHAL SIR ARTHUR CONINGHAM
COASTAL COMMAND
AIR VICE MARSHAL SIR HUGH PUGH LLOYD
NO. 12 AIR SUPPORT COMMAND
GENERAL E. M. HOUSE
TACTICAL BOMBER FORCE
AIR COMMODORE L. F. SINCLAIR
DESERT AIR FORCE
AIR VICE MARSHAL H. BROADHURST

the fine blown sand had adhered even to the tiniest oil smear and this gave them a rusty red appearance. "But," they said, "wait until the ground crews of the squadrons get hold of them. They will soon polish them up."

This pride of possession is characteristic of all the ground crews. The machines are *theirs*; the pilots and air crews are *theirs*; the squadrons are *theirs*. They grumble the

Ground crews servicing a Beaufighter in the desert. Every car that goes past raises a dust cloud, and every engine run-up causes a sandstorm.

whole time—like good Britons—about the designers, the manufacturers, their n.c.o.s and officers. Nevertheless, each one is quite sure that no one else could do his particular job quite so well as he can; and, as a matter of fact, in this air war, he *is* the salt of the earth.

Everything in the campaign is truly Anglo-American, and the nearer to the front line the less critical each nationality is of the other. It was ever thus—the battlefield is the testing place of efficiency and friendship. There is less boasting, less snobbery, and much more doing. The air commands are a 70/30 American-British mixture of senior officers, which also roughly represents the ratio of the respective strengths.

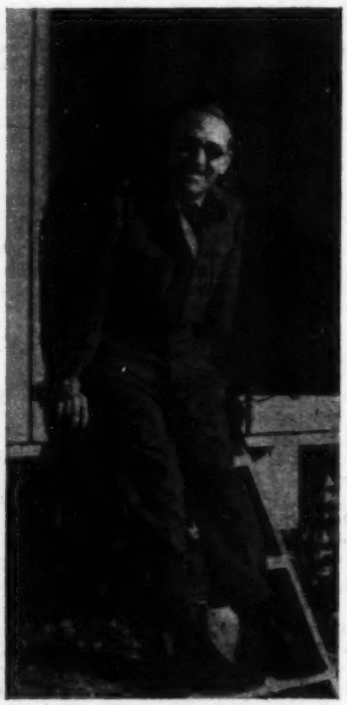
The Dakota in which I travelled bore the new American markings, and its aircrew were all from the U.S.A.A.F. They had to put up with a lot of good-natured banter. One pilot was a New York boy who was an airline pilot before he joined the service, and he had the right mentality for transport work, although he was "as mad as hell" that they would not let him be a fighter pilot. His co-pilot (they are equal in the U.S.A.A.F.; one flies one day, the other flies the next), a very charming fellow, came from the Middle West, and was a very different type. After he had seen his first battlefield sight—a wrecked tank before the bodies had been cleared—he came to me to ask if I thought there was a God to allow such things to happen. He had a very charming wife and baby in America, and war up till then had been something he was doing for *them*; rather like the pictures in the American aircraft manufacturers' advertisements. Contact with the sordid side of the war came as a shock to him. It always does.

Fighter pilots and aircrews have had their praises sung so many times that I feel somewhat incompetent to enter the field. I will say, however, that I have never seen the fellows in better fettle than I saw them there, nor have I ever seen higher spirits.

In the mess of a fighter-bomber squadron near Bari, on the Adriatic coast, I was listening to an account which a flight sergeant pilot was giving of how he had just previously run out of fuel and forced-landed behind the enemy lines. Here he had to break off the story for a while while we scattered, glasses in hand, out of the way of the group captain, who arrived up the steps and into the mess in a jeep with headlights full on. After a brief oration from the driver's seat the jeep disappeared backwards through the door out into the blackness of the night. The smashing of the *Luftwaffe* on that front produces the sort of feelings which can only be expressed in just that way.

With the departure of the jeep the flight sergeant continued his story. An Italian who had made his money in America and had retired to his native land came to his aid. He saw him through the German lines and gave him 40 eggs to take home. The line has now moved past the Italian's home and there is a steady business in eggs.

While in this area I met an Italian captain of the *Regia Aeronautica*. He spoke very good English and said that he was only a captain after such long service as he had to his credit because of his antipathy to the Fascist *régime*. I asked him why the Italians had not done anything about it themselves. He gave a long explanation about how lots of people would have been killed had they tried. When I asked him why he should expect us to come to Italy and lose our lives to throw out the Fascists for them he went straight from the voluble to the mute.



Air Marshal Sir Arthur Coningham at the door of his famous caravan.

The high-spot of the whole trip was the reception by General Eisenhower in the War Operations State Room at Air Command Post. Air Chief Marshal Sir Arthur Tedder, at whose headquarters it was held, was on one side of him and General Carl Spaatz sat on the other. This room, of course, is the focal point of the air war. The walls are covered with large-scale maps of Italy and Sicily, and these maps are all covered by Cellophane. Every detail is there, drawn on the Cellophane with wax pencils which can be erased by the rub of a finger.

Across the width of Italy ran the "bomb line" in bright yellow. Other colours denoted the positions of the divisions, brigades, wings, squadrons, etc., belonging to ourselves and the enemy. The operational range of all the aircraft was shown in a list, and on a similar map on the facing wall were symbols denoting the exact area and strength in which our machines are being employed.

General Eisenhower was wearing perfectly tailored drill clothes with only one medal ribbon. Sir Arthur Tedder wore an R.A.F. blue battle blouse and General Spaatz was in khaki drill with, as is his habit out there, his socks neatly rolled down to the tops of his shoes. The Allied C.-in-C. has a very direct and forthright manner of speaking, with a very full appreciation of air power; absolutely clear in his exact meaning,

and straight to the point. While he is talking he puts one leg across his other knee and clasps his hands in front. Each point is emphasised by leaning forward and backwards and then he sits back and holds his chin in one hand while he waits for the comment.

While General Eisenhower talks, Sir Arthur Tedder smokes his pipe and either puts his elbows on the table and holds them in both hands, or strokes the "alderman's nerve" at the back of his head. Every now and then he would interject some reasoned comment. General Spaatz, as befits the job he holds, has the air-operating mind: to turn the big picture into a series of orders to Strategic, Tactical or Coastal Commands.

I saw both of these air commanders on other occasions, General Spaatz when he was host at a luncheon in the beautiful villa which he uses as a headquarters, and Sir Arthur Tedder in the same War Operations State Room. Sir Arthur thinks air, talks air and lives air. He has in his mind a complete picture which is beyond the comprehension of ordinary folk. A battle problem is immediately translated into the employment of air forces, and every air attack by the enemy is carefully assessed in order that an accurate picture may be formed of the inside workings of the mind of his opposite number, Kesselring. His enthusiasm lights up his face, but there is no bombast, no waving of the big stick nor threats as to the future. He fights without hate or bitterness, and his unclouded brain must be the better for it.

General Eisenhower (farthest from camera) walking with Air Vice-Marshal Broadhurst to the Desert Air Force headquarters.

Air Vice-Marshal Sir Hugh Pugh Lloyd, who is A.O.C. Mediterranean Coastal Command.

One of the most colourful of all our commanders must be Air Marshal Sir Arthur Coningham—known to everybody as Mary Coningham. The soubriquet is no slight, it is merely a corruption of Maori indicating his association with New Zealand.

Let me picture for you the late-afternoon air conference at his headquarters in a Sicilian orchard. Outside his famous caravan, which he has brought all the way from El Alamein, was a semi-circle of chairs. When we arrived he called for his servant to bring a table from behind the caravan. On the table were glasses and bottles of lemon juice. He passed the glasses round and insisted upon filling each one himself. It was typical of him. He is like a piece of enthusiastic quicksilver—he has a brightness of manner which in any other man would appear forced.

Having completed his welcome he put a map of Italy in a convenient place and, taking a fly whisk to use as pointer, emphasiser and fly whisk, he recounted the achievements, duties and side-lights of the Tactical Air Force which he commands. His sparkling delivery and the intimate knowledge of his subject keeps the audience listening with rapt attention. Explaining at length, but never boring, he goes on and the late afternoon turns into twilight. A Sicilian peasant going home on his donkey cart wishes the air marshal good night as he passes, and receives a polite acknowledgment; this is the only interruption of an enthralling story which, for security's sake, unfortunately cannot be published. As the twilight gets dimmer Sir Arthur leans over to switch on an electric light so that the map can more easily be seen. Moths flutter round the light. The conference ends and I stumble out in an unfamiliar darkness to find my tent and spend the remainder of the evening in the headquarters camp.

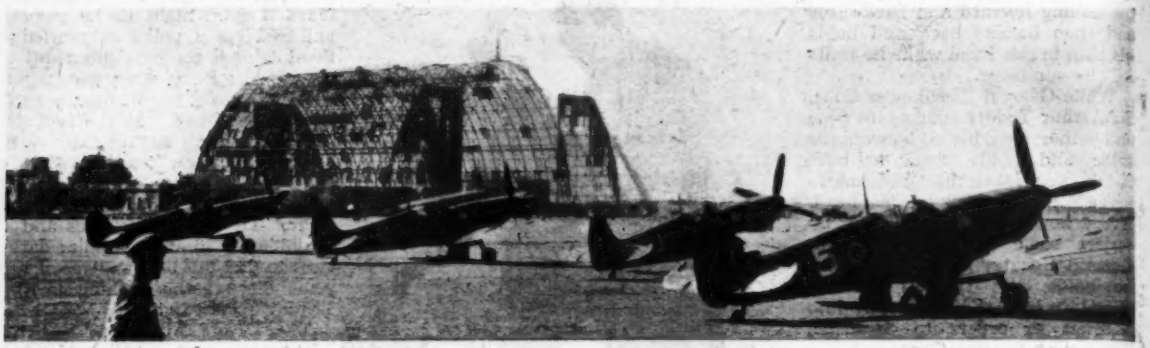
The Desert Air Force and its commander, Air Vice-Marshal Harry Broadhurst, are inseparable. Like "Monty" and his famous Eighth Army, they are almost legendary. He met the aircraft I was in by flying to the airfield in his own aircraft, whisking off a couple of the passengers to his own private hide-out, while the remainder followed by car. Close to his headquarters he keeps the smaller aircraft for use where take-off or landing space is restricted, but he is still a fighter pilot at heart, and he flies a Spitfire about his business when opportunity affords. Although I had not seen him for at least five years, he immediately recalled our first meeting in 1936, when I went to No. 19 squadron to photograph him and two other pilots practising the first tied-together aerobatics on Gloster Gauntlets for the Royal Air Force display. He was a flight lieutenant then. He is now an Air Vice-Marshal at 38.

Coastal Commander

The responsibility for the opening of the Mediterranean obviously fell heavily on the Coastal Command in that theatre, but its commander, Air Vice-Marshal Sir Hugh Pugh Lloyd, does not appear unduly harassed. In fact, he has quite a whimsical manner and also a chin that stands no nonsense. He is intensely pleased at having

The Italian pilot (centre) referred to in this article, recounting his adventures by the tail of the Piaggio 108 he used to fly. Note our co-belligerent's pistol still being worn while our officers are unarmed.

PEOPLE AND PLANES



Spitfire Nines on an airfield near Taranto. All types of modern Spitfires are to be seen on the Italian front.

Parachutes of a Spitfire squadron hung in the warm Italian sunshine. There are no special hanging rooms in the field.

beaten the *Luftwaffe* and at having more or less stopped Germany's sea-borne supplies. Every point made, and every mark of satisfaction at results obtained, is followed by a touch of a finger on the table and then on the forehead to propitiate the god of war lest he should be thought to boast unduly.

This is a different operations room. The wall maps are there, but the real work is done on smaller-scale maps pinned to an inclined drawing-board. Circles representing the ranges of Coastal Command aircraft cover the whole of the Mediterranean.

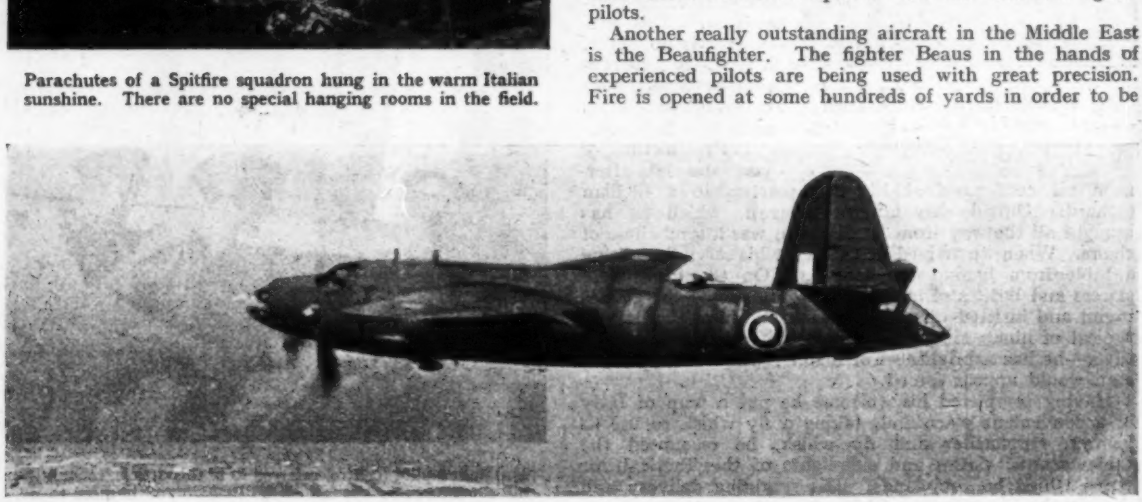
Anglo-American Dovetailing

Turning now from the people to the aircraft, I must again emphasise the Anglo-American dovetailing. Spitfires are to be seen with American markings; Marauders and all the medium bombers bear either the five-pointed white star or the R.A.F. roundels. Only the Fortresses are exclusively American.

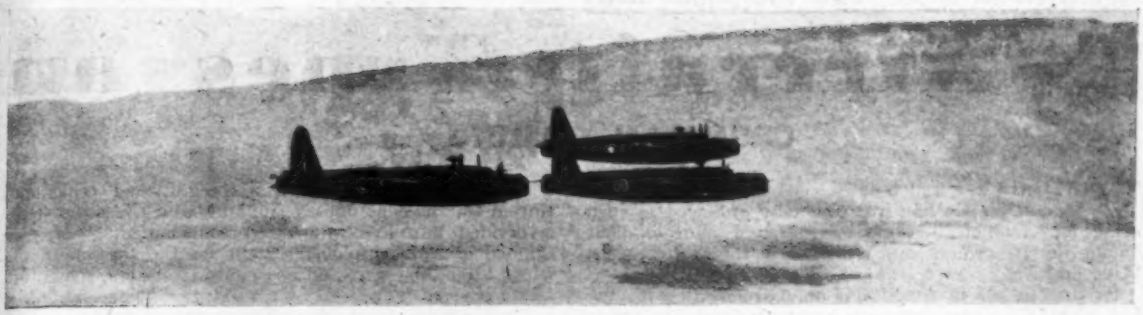
An R.A.F. squadron I visited had Marauders (the earlier B26A shorter-span type). They seemed to find them quite amenable, if not easy machines to fly, and had nothing but praise for the cockpit layout. This has been most carefully thought out, and everything comes to hand in the proper sequence and almost automatically.

The beloved Spitfire is everywhere in both quantity and variety. There are Spit Fives and Spit Nines; some with clipped, normal or pointed wing-tips. No one is more enthusiastic about the Spitfire than the American fighter pilots.

Another really outstanding aircraft in the Middle East is the Beaufighter. The fighter Beaus in the hands of experienced pilots are being used with great precision. Fire is opened at some hundreds of yards in order to be



A Martin Marauder B26A over the North African coast.



PEOPLE AND PLANES

at a safe distance when the enemy's bombs blow up.

At one time there was a special force composed of two Beaufighter squadrons, two reconnaissance squadrons of Baltimores, and a night strike of torpedo Wellingtons, whose job it was solely to watch the Italian fleet. It had a complete block of Genoa and Spezia. It had a secondary job, which was to stop all traffic between Sardinia, Corsica and the mainland. The Beaus were finally switched on to stop the Ju 52s on this run after the Italian fleet had surrendered.

The Beaufighters are not fearsome to handle, although they are not to be treated without respect. I saw one swing on take-off and, leaving the runway, crash and catch fire. The crew jumped clear to safety. It is interesting to note that, generally speaking, the Germans operate from shorter and rougher runways than is our usual practice.

Lightning Fighter-bomber

As a long-range fighter the Lightning has done good work in Sicily and Italy. As a fighter it lacks the manœuvrability and small turning circle of the single-engined types, but it has a range equal to that of any of the medium bombers. During the Salerno invasion it could stay over the beaches for a whole hour as compared with the 20 minutes of the Spitfires. On special occasions it carries a 1,000 lb. bomb, and even then still has a range of 500 miles.

Having travelled so many miles in one, I should be ungrateful not to give the Dakota a pat on the back. Load does not seem to matter. There is very little difference in the take-off whether the overload fuel tanks are full or empty. With all tanks full, there are 836 American gallons of fuel available and 48 gallons of oil. The all-up weight is in the region of 30,000 lb., of which about 6,000 lb. represents the disposable load. The spacious double doors on the port side of the fuselage are specially designed for dropping paratroops, and are of sufficient width, if both are opened, to admit vehicles up to the size of a jeep. Spitfire fuselages can also be carried by this all-purpose transport. The Dakota is doing a big job in this war, and doing it well.

The technique of the fighter-bombers I described last week, and there is nothing new to report about the machines, except that some of the pilots think that the Kittybomber is on the heavy side when carrying two 250 lb. bombs. Originally, they carried only one. The method of attack which has been evolved is a very successful one. The bombing is particularly accurate.

The Wellington is still doing a very good job in the Mediterranean. It is used for torpedo dropping and night bombing.

Martin Baltimores used by the Mediterranean Coasta Command for reconnaissance and bombing.

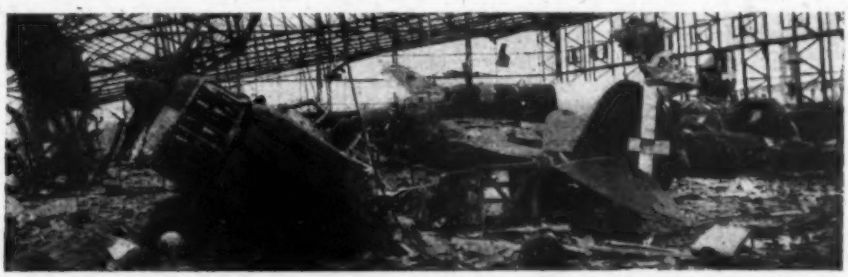
Under the heading of "Tunisian Aero Show," we recently published all the latest information about enemy types employed in the campaign, and there is little to add now. In fact, the *Luftwaffe* is so scarce that there is almost nothing being brought down nowadays.

The Germans are still using the old JU 87 where they are quite sure none of our fighters will put in an appearance, and they are mounting some heavy (37 mm.) guns on these as tank-busters. There cannot, however, be much of a future in flying Ju 87s whatever armament is fitted.

Caproni 313s

On the airfield at Montecorvino were three wrecked Caproni 313s with inverted vee, 12-cylinder, 650 h.p. Isotta Fraschini R.C.35 air-cooled engines. Each has two fixed, forward-firing 0.5in. machine guns, one on each side of the fuselage in the leading edge of the centre section. Two of them have two more supplementary 0.5in. guns mounted externally below the centre section in fairings similar to those used on the Hurricane IID. The Caproni dorsal turret mounts a single 0.5in. machine gun, which is aerodynamically balanced by a dummy barrel diametrically opposed and geared in such a way as to rise and fall with the real gun. The main tanks are in the wings, but extra fuel tanks can be fitted on each side of the fuselage just aft of the dorsal turret. The wing structure is of wood, and the fuselage is welded steel tube.

As I saw these and many other Italian wrecks lying there in the hot sunshine, with little quick, green lizards darting over them, it seemed a poor end to the great and boastful *Regia Aeronautica* which was so proud in the days when it bombed helpless Abyssinians into submission.



Seventy-second of the Latest Recognition Series

Aircraft Types and

GRUMMAN GOSLING (J4F–1)

VIRTUALLY a scaled-down version of the Grumman Goose, the Gosling was originally produced in 1940 for commercial work and for the more opulent among private owners, and is known in the States as the Widgeon.

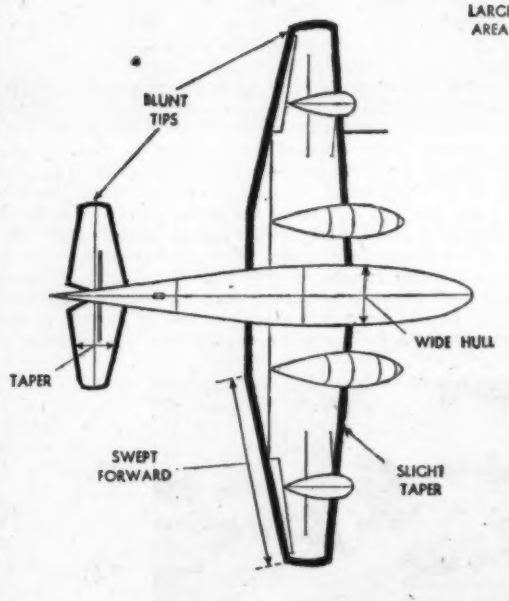
Its present use in America is on patrol work with the U.S. Coast Guard to whom it is known as the J4F-1, but it is also employed for training purposes, on communications and on coastal defence work by the R.C.A.F. in Canada. A few may possibly be in service with the R.A.F. as ambulances for the Air/Sea Rescue Service.

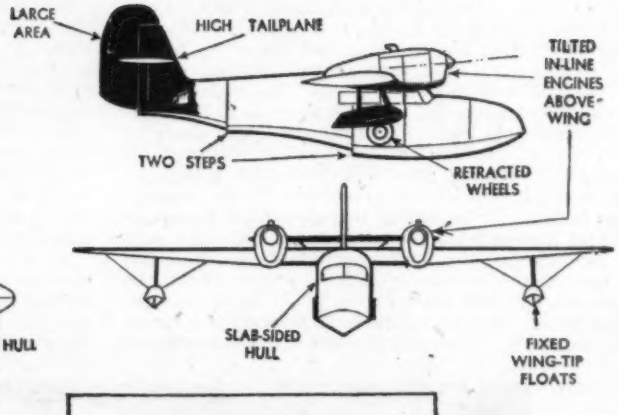
Fitted with two 200 h.p. six-cylinder in-line inverted air-cooled Ranger engines, the Gosling has a top speed of just over 160 m.p.h., and cruises at 150 m.p.h. on 75 per cent. of its power. It has a cruising range of 775 miles and a service ceiling of 15,000ft. Its gross weight is 4,500 lb.

Of all-metal construction, the high cantilever wings have a single box-spar incorporating integral fuel tanks and slotted trailing-edge flaps. The hull, which has two steps, is divided into five watertight compartments. Stressed skin covering is employed except for the portion of the wings aft of the spar and the control surfaces, which are fabric covered.

The land wheels of this small amphibian flying boat all retract and are hydraulically operated, the main wheels being drawn up into pockets in the sides of the hull, and the tail wheel (which has a directional lock) folding into a recess behind the rear step. Emergency hand-operated retraction is also provided.

Recognition features are notable: the typically Grumman square-tipped wings with rectangular centre-section and tapered outer panels; tapered, square-tipped tailplane set half-way up the fin and strut-braced to the stern of the hull, and large angular fin and rudder.





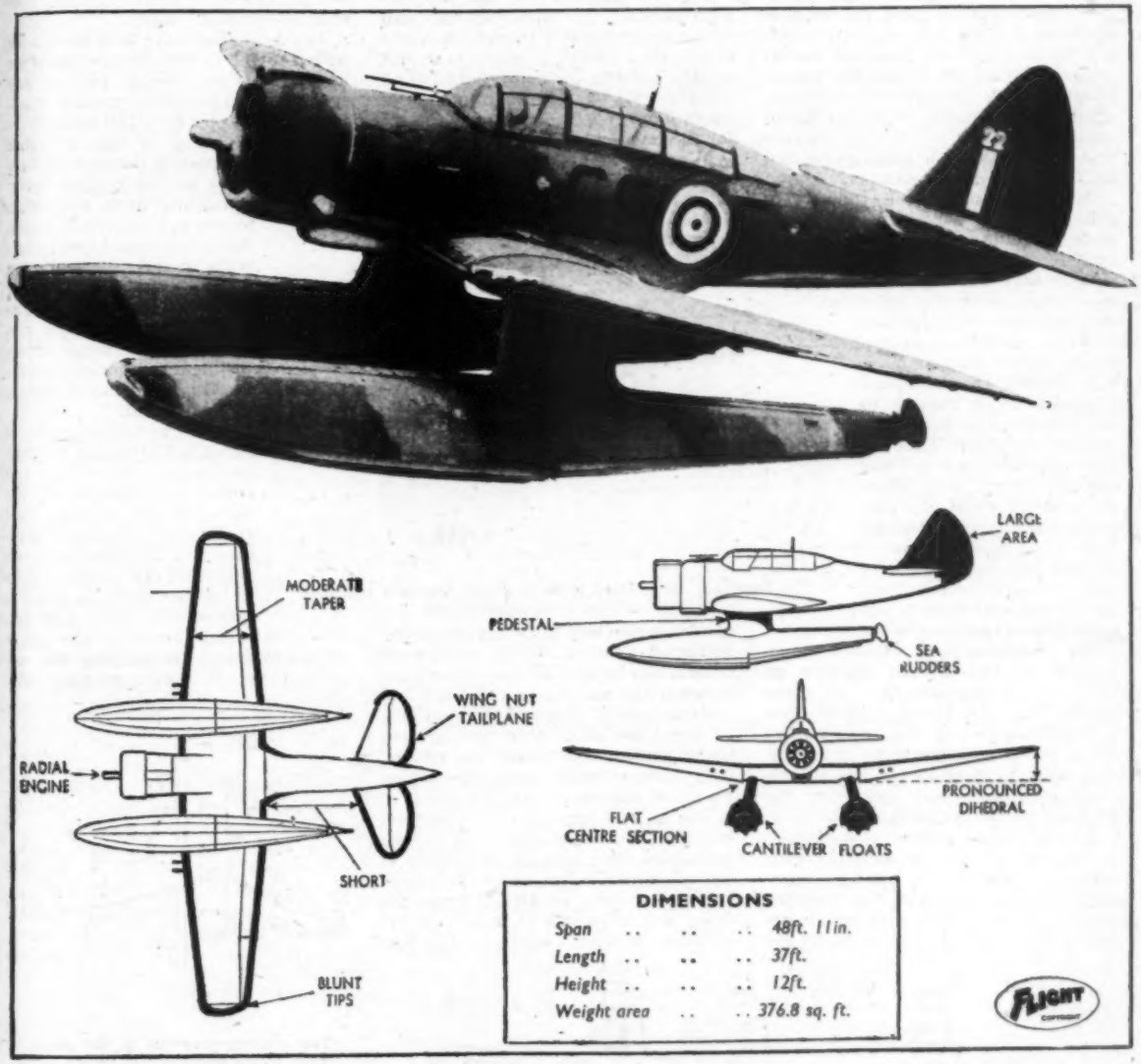
DIMENSIONS

Span	*40ft.*
Length	*31ft.*
Height	*9ft.*
Wing area	*245 sq. ft.*

FLIGHT copyright

...heir Characteristics

NORTHROP N-3PB



DIMENSIONS

Span	*48ft. 11in.*
Length	*37ft.*
Height	*12ft.*
Weight area	*376.8 sq. ft.*

UNTIL recently transferred to Great Britain, the Norwegian squadron operating with the Coastal Command of the R.A.F. in Iceland was mainly equipped with the Northrop N-3PB two-three-seater floatplane, augmented subsequently by the Catalina flying-boat; now the squadron has been re-equipped with Sunderlands.

The Northrop, however, proved particularly useful in the conditions existing in and around the squadron's Icelandic base—conditions which were not always suitable for bigger aircraft—and it fulfilled its duties admirably.

Powered by a nine-cylinder air-cooled radial Wright Cyclone engine rated at 950 h.p. at 2,300 r.p.m. at sea-level, 1,000 h.p. at 4,500ft. and 1,100 h.p. at 2,500 r.p.m. for take-off, the Northrop floatplane has a top speed of 260 m.p.h. at 16,400ft., a cruising speed of 217 m.p.h., a service ceiling of about 25,000ft. and a cruising range of just over 1,000 miles.

Offensive armament comprises four 0.5in. machine-guns mounted in the wings. For defence there are two other guns, which may be either 0.3in. or 0.5in., one in the rear cockpit and the other firing aft from a gun position in the floor of the fuselage between the trailing-edge and the tail. Its bomb load may consist of five units of bombs of a total weight up to 2,000 lb., carried under the fuselage and in wing racks, or a 2,000 lb. torpedo slung under the centre-section.

All-metal construction, with flush-riveted stressed skin except for the fabric-covered control surfaces, is employed throughout, the fuselage being an oval, semi-monocoque structure, and the wings of multi-cellular design with detachable tips. Split trailing-edge flaps are fitted. The floats are attached to the extremities of the rectangular centre-section by cantilever pedestals, and have small sea-rudders. Normal loaded weight is 8,500 lb.

Pre-selected Engine Speed

Lockheeds Introduce Slave Unit for "Press-button" Control

THE Lockheed system of speed control of airscrews has been developed to meet the requirements of the Air Ministry, viz., that a lever in a gate or quadrant should select an exact predetermined engine speed when an aircraft was taking off, climbing, or cruising at its maximum speed, the engine r.p.m. in each case to be the maximum speed permitted by the engine manufacturers.

The ability of the pilot quickly to shift a control lever into any one of these positions at any required moment must obviously save valuable time and effort, since the pilot does not have to adjust his airscrew pitch or engine r.p.m. in the normal manner. When the Lockheed control lever is moved to the take-off notch on the quadrant, the airscrew moves to fine pitch and the engine r.p.m. are automatically adjusted to a predetermined speed, which cannot be exceeded.

Similarly, selection by the control lever for climb and maximum cruise, brings equally exact control of engine speed—the constant-speed airscrew functioning in the normal manner at these set engine speeds. In other words, the Lockheed system has a rough parallel in the press-button radio set in that the mere actuation of a control effects all the fine adjustment necessary and cuts out the human error always likely to be present.

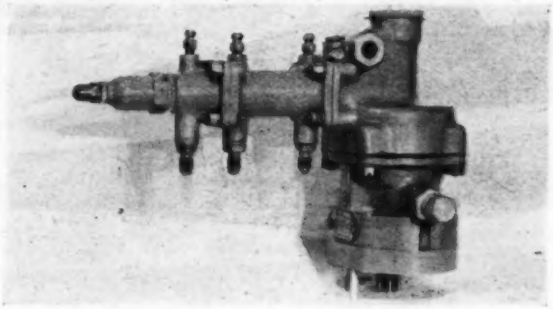
The Lockheed system of hydraulic remote control not only pre-sets engine speed in certain phases, but has a paramount virtue in controlling multiple engines in an aircraft with equal precision, by a multi-lever unit under the control of the pilot or the engineer in charge of engines on an aircraft. Furthermore, the four-lever unit can be transferred direct to the engineer's cabin, thus leaving a single-lever unit for the pilot for the main control of all the engines—the hydraulic method of operation being especially adaptable for these varieties in control.

In addition to predetermined engine speeds for take-off, climb, and maximum cruise, the Lockheed system by further movement of the lever in the quadrant also sets the airscrews in the feathered position, while a separate control can be used to vary the r.p.m. between the maximum and minimum cruising speeds. If any of the hydraulic oil pipes are shot away or fractured under service conditions, the control unit automatically sets the engine r.p.m. at maximum cruising speed.

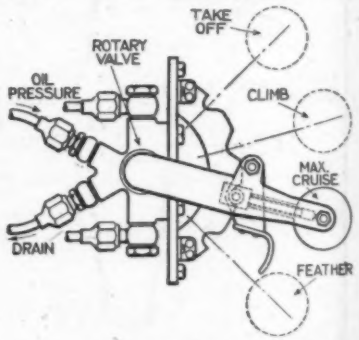
The normal type of constant-speed airscrew has a governor unit which maintains the r.p.m. of the engine at various throttle and boost positions. In the Lockheed control, a hydraulic servo unit is employed to act on the governor in such a manner as to bias or set the governor spring to obtain the desired fixed engine speeds; this unit is termed a "slave."

The Lockheed slave is a small unit bolted direct to the airscrew governor housing. It has several pistons and springs which positively actuate a piston rod connected by a bell crank lever to the upper end of the governor spring. After passing through a rotary valve operated by the control lever, oil under pressure from the main hydraulic supply in the aircraft is conducted through pipes to two ports in the slave cylinder. At one end of the slave unit are adjustable stops in an accessible group which permit of a wide range of adjustment for various engine speeds for individual engines on an aircraft.

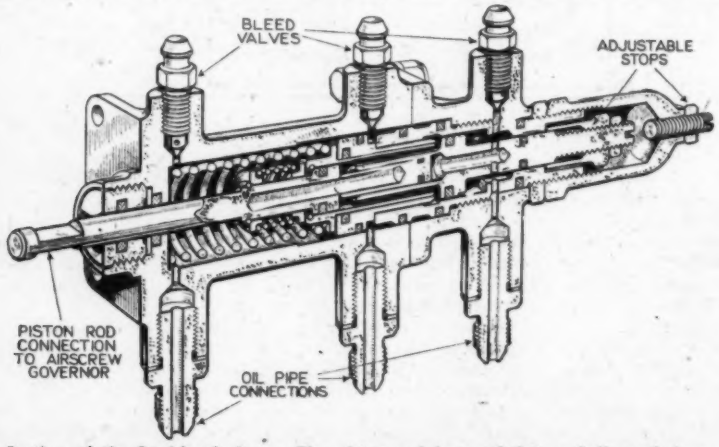
Referring to the group of simplified diagrams showing the series of piston and spring movements of the slave, it will be seen that the piston rod (which actuates the airscrew governor spring, is moved from right to left in a series of positive movements for take-off, climb, maximum cruise, cruise range adjustment and feather, by the admission of oil under pressure into



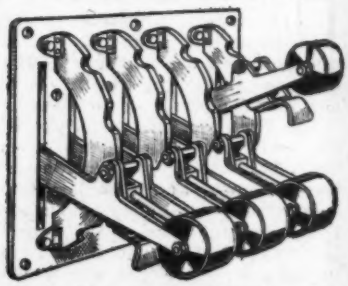
The Lockheed slave fitted to an airscrew governor housing.



The various positions of the control lever which operates the rotary valve in the oil pressure and drain circuit.

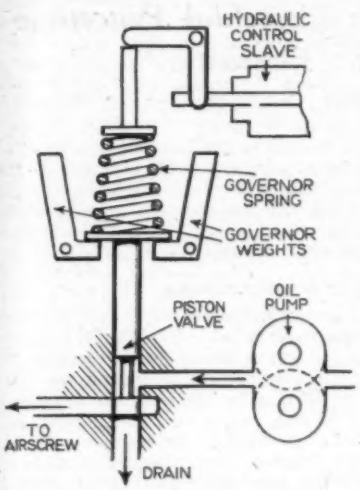


Section of the Lockheed slave. The piston rod is coupled to a bell-crank lever bearing on the spring in the airscrew governor housing.



A four-lever control panel, with safety catches to prevent inadvertent movement into feather position.

PRE-SELECTED ENGINE SPEED



The Lockheed slave operates the airscrew governor piston valve through the governor spring.

either of the ports. In the actual unit, one of the pistons slides within the bore of the slave barrel, while others slide within each other, and each has an oil-tight sealing ring to prevent oil leakage.

Guarding Against Failure

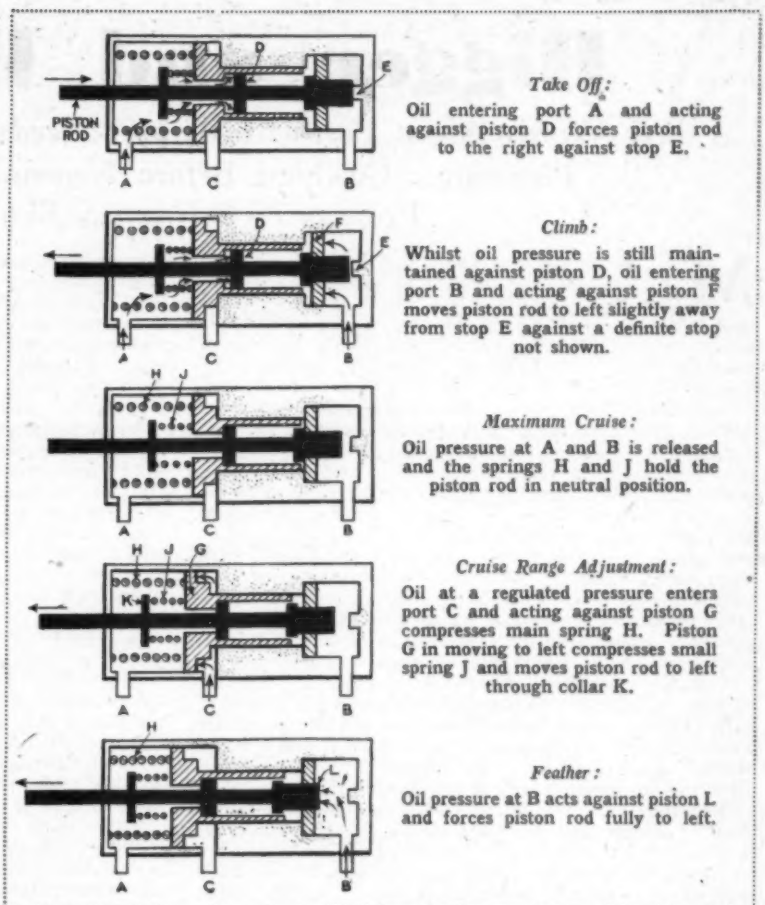
In the event of failure of oil pressure to the slave, the two coil springs automatically cause the pistons and piston rod to move to the maximum-cruise position. At the end opposite to the governor actuation are the adjustable stops which limit the movements of the piston rod, while above the barrel of the slave are the normal type of Lockheed bleed valves for the liberation of air bubbles when the system is filled with oil.

The pipe-line system for the supply of oil to the slave conducts oil first to the rotary valve operated by the main control lever, and thence by one of two pipes to the ports A and B of the slave, according to the selected position of the lever. Oil exhausted from the slave passes to the rotary valve and thence through a drain pipe back to the main hydraulic oil reservoir. When the lever is moved to the cruise range adjustment position, a separate fine-adjustment control forces oil by a miniature hydraulic ram to the port C and moves the piston G in exact response, so providing an overriding control of the governor and airscrew for adjustment of cruising speeds over a range of 800 r.p.m. This fine control is provided for each engine in a multi-engined aircraft, and enables the most efficient and economical running to be obtained from the engines on long flights in varying conditions.

As mentioned earlier, the slave operates the governing spring in a series of movements through a bell crank lever. When downward pressure is applied to the governor spring, the pressure is communicated to a piston valve which controls the oil passing from an oil pump to the mechanism actuating the airscrew blades, the angle of which in turn governs the speed of the engine. Except in the case of feathering, the governor still continues to control the airscrew for constant-speed purposes during all other selected movements by the slave.

In a four-engined aircraft the main controls for the four slaves are grouped together on the control pedestal, or in any convenient position for the pilot, with the cruise range adjustment sub-controls nearby. Each main control lever has a finger-operated safety catch to prevent inadvertent movement to the feather position.

Various further combinations of controls can be conveniently arranged or distributed as required. For example, a four-lever control can be under the command of the pilot with the fine-adjustment controls for cruising in charge of the engineer. Alternatively, a single lever for the four engines can be given to the pilot, with a four-lever panel for the engineer which would override the pilot's single lever.



Take Off:
Oil entering port A and acting against piston D forces piston rod to the right against stop E.

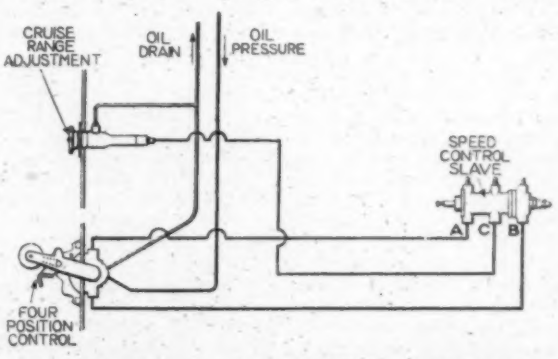
Climb:
Whilst oil pressure is still maintained against piston D, oil entering port B and acting against piston F moves piston rod to left slightly away from stop E against a definite stop not shown.

Maximum Cruise:
Oil pressure at A and B is released and the springs H and J hold the piston rod in neutral position.

Cruise Range Adjustment:
Oil at a regulated pressure enters port C and acting against piston G compresses main spring H. Piston G in moving to left compresses small spring J and moves piston rod to left through collar K.

Feather:
Oil pressure at B acts against piston L and forces piston rod fully to left.

The Lockheed slave, shown in simplified form, in five movements of its piston rod.



The oil pipe-line system to the control valve and Lockheed slave. The cruise range adjustment provides a separate hydraulic control when cruising.

Topics of the Day

Bigger and Better

A Few Words About Post-war Airport Needs : Parochial Peacetime Planning : Goodness Before Nearness : Fantastic Projects by Self-styled Experts

MOST of us would, I think, find it rather amusing to look once again at that often-amended Air Ministry book which, in peacetime, gave plans and dimensions of all the airfields and airports in this little country of ours. Nearly all of the fields would, by modern standards, look pathetically small, yet they seemed to be big enough in those days, and none of them had runways.

Very few of them have remained unmodified, and those few are very little used. I landed on one the other day for the first time since war was declared. For the type of aircraft I was flying there were only two usable directions, and the run was depressingly short. Furthermore, since the grass was wet, the brakes were almost useless. I imagine the runs were in the neighbourhood of 850 and 750 yards, with considerable obstructions on the approaches. Such obstructions would not be considered by the pilot of a light plane, or even of one of our "economy-utility" passenger biplanes of peacetime, but they are certainly a bother nowadays, when at least a clear mile is needed for the final approach, even with medium-sized aircraft.

Yet this particular airfield was used by the internal airlines—I remember once being landed there as a passenger in a D.H. 86—and I believe even that K.L.M. Douglases used it once or twice before the pilots decided that it really was too much of a tight fit for aircraft of that class. This is no time to speak of lack of foresight by the powers who picked and finally laid out the field—the mistake was discovered and rectified (at considerable cost) very soon afterwards—but it is difficult not to wonder how much influence our parochial ideas of airfield size and nature must have had on civil aircraft development during the few years immediately preceding the war.

Design Limitations

Unless ordered directly by and for Imperial Airways and apart altogether from the question of operational economy on largely unsubsidised internal airlines, what point *was* there in designing and manufacturing an efficient transport which could only use three or four fields in the whole of the British Isles? The use of grass, alone, prevented full and rapid development. Imagine the effect of two-hundred-odd braked landings by heavy aircraft on the average peacetime field, and early wartime experience has shown just how long it takes for a newly sown or turfed grass area to become even partially serviceable. Nearly all grass airfields become partially or entirely useless in the winter months—if not through their own natural drainage difficulties and lack of solid strength in the grass itself, then through continuous use by aircraft.

In the first winter of the war, before Works and Bricks had got to work on them, some of the grass fields used for training were nothing more than quagmires. Yet because the training of pilots and the storing of aircraft had to continue, aircraft went on flying, taking off and landing in a muddy spume, looking more like flying boats operating from a swamp than anything else in the world. The war did a great deal more than speed things up. I doubt if, even by now, civil airports in this country would have had concrete runways of anything from a thousand to two thousand yards—the cost would have appeared altogether too prohibitive, and our Governments never thought of civil aviation as much more than a thundering nuisance.

When it is all over we shall not, apart from the necessary military fields, need more than about five per cent., if that, of those that have been built, but let us make sure that these are firmly held and properly maintained for civil use. Two or three will be needed in the London area as Continental terminals, and at least the same number, on the West coast, as Atlantic terminals. I can't see much object in building new and splendiferous land-sea airports unless such gargantuan projects are necessary in order to give people jobs and politicians something to talk about.

Airport Proximity

Additionally, each large town and city should be given the chance to pick the most suitable local airfield for the town's own use and to act as an extension terminal for the main airlines. Much better for the councils to jump on really big ones, which may be more than half an hour away by road, than to pick out or to build useless little ones within easy reach of the centre. Few people are going to travel by air from London to Manchester or Glasgow when there are perfectly good and fast railway services between such centres, but anybody who is coming from, or going to, the Continent or the United States will find it more convenient to go by air all the way if this is reasonably possible. Furthermore, people will be likely to find the air more convenient and faster for over-water travel to the Isle of Man and Ireland. In such cases the odd half hour's additional travel by road is not going to make a scrap of difference, and the advantages of using an airport which is fit for all types greatly outweigh any small saving there may be in local travelling time.

Unless there is a fundamental change in aircraft design, "centre" airports are out of the question for good; considerations of space and weather make them impossible, and if the traveller *is* going to climb aboard a bus or special coach, then he or she may just as well travel a little farther and leave eventually (if he knows what is going on) in greater mental comfort. Projects of the "roof airport" or "rotating airport" type are amusing while they are still only ideas in the minds of architects or ambitious contractors, but they are entirely impractical—as any operator or pilot could tell them. Hyde Park in London and Alexandra Park in Manchester, for example—the last *was* once an airfield—have been suggested as possible sites regularly during the past two decades by people who knew no better. In the old days such sites were dangerous because engines were unreliable, and later because the obstruction-free runs for approach and take-off would be hopelessly inadequate. Furthermore, no sensible person could expect the use of these and similar open spaces to be denied to the many because a very few would find it a little more convenient in their air travels.

Finance and Politics

At this stage in the war it would be impossible, and bad from the security point of view, to suggest a few airports that might be handed over eventually for airline use, but this will be easy enough in due course. Let us not then allow a few people with financial or other axes to grind and with no knowledge of operating conditions to make the decisions, or we shall have repetitions, on a much larger scale, of some of the almost criminal performances of the last years of peace. Even if the chairmen of "Airport Committees" must necessarily be local politicians, let the rank and file, at least, know what they are talking about—otherwise we shall have dozens of airports of the size of cricket pitches, the councils fondly imagining them, after "expert" consultation, to be fit for use by all modern types. One never could really discover who these "experts" were; usually they seemed to be people who

had learnt to fly light planes or who flew "modern" types when these were stick-and-wire biplanes with the take-off and landing runs of Tiger Moths.

The trouble is, and always has been, that theoretical run figures are given and taken when airfield dimensions are being considered. Because, in expert hands and when everything is going well, a transport will take off, fully laden, in six hundred yards, and land and come to a stop in the same distance, it doesn't mean that an airfield need only be eight hundred yards square. Quite apart from obstruction problems, allowances must be made for special conditions, for pilots who are strange to the airfield and for aircraft with loss of power or fading brake pressure. And, however well he knows the field, a transport pilot who has been at the controls for two or three hours does not like to be faced with the final job of judging his approach height to a few feet and his approach flight to a few miles an hour. Sooner or later, if his aircraft only just "fits" with a little to spare, he is going to "boob" and possibly lose his licence. We all have our "off" days when both landings and approaches are shaky.

I often wondered what airline pilots thought when, day after day, they had to take off from and land at airports which allowed them no margin. When not quite air-borne with the boundary hedge a hundred yards away, or when coming in through thick weather and in heavy rain, they must have cursed the city fathers who, so often, spoilt the ship for a ha'p'orth of tar and left *them* holding the baby. None of the dozing passengers realised that the outfit was crossing the hedge with a foot to spare and on the edge of the stall just because somebody wouldn't pay a few thousand pounds for the extra bit of ground.

Strangely enough, the improvements which can be expected after this war in the various radio aids to actual and final-approach navigation will involve a demand for larger airfields, because pilots will be landing in much worse weather but will still be depending on natural senses for the final touch-down. With the possibility that "overshoot action" will have to be taken at the last moment, no pilot is going to cross the inner marker beacon with nothing in hand, and, landing partially blind, he will be unhappy unless he knows, as he crosses the partly invisible boundary, that he has lots of runway in front of him.

So let the airport planners think big—bigger than ever.

"INDICATOR."

THE LEIGH LIGHT

ALTHOUGH it has been in operation for more than a year, and that therefore presumably many a German submarine commander must have returned to base with information about its existence, it is not until now that the Air Ministry has permitted our own people to learn something about the work done by the Leigh anti-submarine aircraft searchlight.

Inventor of the searchlight, which is said in the Air Ministry statement to throw a beam of "millions of candle power," is Wing Commander H. de V. Leigh, O.B.E., D.F.C., who is a veteran of the first world war, when he served in the Royal Naval Air Service.

The idea was conceived in the days when Air Chief Marshal Sir Frederick Bowhill was A.O.C.-in-C. of Coastal Command, and when Wing Commander Leigh was posted to headquarters he found himself under his old squadron commander of the R.N.A.S. days. An experimental flight had been formed earlier, and after a time the development work had progressed far enough to justify the formation of a squadron. Success attended its first operational flight, and soon more squadrons were formed. These have been in operation for some time and have done good work.

Until Coastal Command aircraft were equipped with searchlights, the U-boats had enjoyed virtual immunity from air attack on all but bright moonlit nights. Often the aircraft crews would be able to detect the phosphorescent wake of U-boats, but this rarely sufficed for accurate sighting. The Leigh searchlight has changed all that, and now the enemy submarines run considerable risks in coming to the surface at night to recharge their batteries. As a result they are often compelled to submerge at night and surface in the daytime, when they hope to sight our patrolling aircraft in time to dive before they are detected.

No technical information concerning the Leigh searchlight has been disclosed. The reference to "millions of candle power" indicates that its consumption must be rather heavy, from which fact one may deduce the assumption that the Leigh squadrons do not go cruising around with their searchlights blazing. That would, in any case, defeat its own object since it would warn the U-boats. Switching-on of the searchlights is presumably momentary when other evidence has suggested the presence of an object which appears to need closer examination.

PROTOTYPE ON TRIALS

"BRITISH AIRWAYS 64." This is the name of a new launch recently delivered to B.O.A.C. Built by W. J. Tod, Ltd., of Ferrybridge, Weymouth, it has a length of 30ft. and a beam of 8ft. The engine is a single Ford V8 Kermath which delivers 85 h.p. at 3,600 r.p.m. The propeller is driven through a 2:1 reduction gear, giving a speed of about 12.5 knots. The launch is intended for general purposes connected with passenger traffic and with the transport of engineers to locations with scant maintenance facilities. The prototype is the first of 20 similar craft to be used by B.O.A.C overseas.

Air Transport

Post-war Civil Aviation Debate in House of Lords

ONCE more the nation is indebted to the Marquess of Londonderry for raising in the House of Lords the question of post-war commercial aviation. As a former Air Minister Lord Londonderry is thoroughly familiar with the subject, and his perseverance in prodding the Government and in demanding a clear statement of policy is as admirable as it is pertinent. On this occasion, October 20th to be exact, a great change had taken place compared with previous debates in Parliament. The Empire Air Conference had been held, its complete agreement had been announced, and Lord Beaverbrook, who had presided over the conference, has been entrusted with the task of guiding future developments.

LORD LONDONDERRY referred to the unsatisfactory replies given by Government spokesmen in the past, and he felt impelled to use a saying which he had employed before: "Just tell me anything you like, but do not take me for a complete fool." Innumerable pamphlets and endless representations had in the past fallen on deaf ears. Although the last representation he made was as long ago as July 13th, he was still without any further information than he had at that time. He thought one of the greatest difficulties was the War Cabinet. None of the Departmental Ministers who constitute it had executive authority to state in a definite way what the Government policy is. He expressed the wish that Lord Beaverbrook was in the War Cabinet, but thought that Lord Beaverbrook, with his accustomed drive and determination, would achieve as much in the position which he now occupied, whether or not he was in the War Cabinet.

Lord Londonderry then briefly stated what they wanted. They wanted a statement of policy on Empire aviation. They wanted to know the Government's policy on international air lines. They wanted to know the position which the Government took up with regard to monopoly. And, finally, they wanted to know whether the Government had made up its mind that civil aviation should be separated from the Air Ministry. He felt that we should have an Empire Air Council, which should be in continuous session.

Peaceful Penetration

In pleading for information about the question of monopoly, Lord Londonderry stated that Mr. Yarex was over here. He controls West Indian Airways and has large interests in South America. Those interests had been sold to Mr. Luce and Mr. Kaiser. Our West Indian Airways was associated with the British Overseas Airways Corporation, and yet this tremendous undertaking had gone by the board without many people knowing anything about it.

On the question of Air Ministry control of civil aviation Lord Londonderry said that he felt that in view of the vast development, civil aviation should not come under the Board of Trade, nor under the Ministry of Transport, but we should have a Minister of Air Transport. He was in favour of admitting shipping interests to future air transport. It was due to them that the British flag had been planted all over the world, and they had the knowledge and technique of transport. Co-operation with America was necessary, and he thought it would be forthcoming. But if Lord Beaverbrook were to go to America he should go with a policy and a plan.

LORD BRABAZON OF TARA paid a tribute to Lord Londonderry's persistence, which had now resulted in the transfer of Lord Beaverbrook from the Opposition to the Ministerial Bench! There were a lot of questions to be answered about the freedoms of international aviation. We might get agreement within the Empire, but other countries might refuse to agree. He had no doubt some conclusions had been arrived at, but there was a lot of loose talk in America, and in this case it was spelt "Luce." In this country we had a very grave suspicion that if we did not send somebody with the astuteness of Lord Beaverbrook we might be tripped up in negotiations with America because one wanted a long spoon when supping with Pan Americans.

The great route of the world was going to be America-Europe. For some years it could not be flown non-stop as a regular route. Newfoundland was important because it was on the direct geodesic line. In Newfoundland the British Empire had the two most important bases in the world. The Americans might talk about others, but there were no more important bases than Goose Bay and Gander in Newfoundland. He hoped the Government would see that they remained in Newfoundland's hands.

In connection with post-war aviation we had not the personnel. The Americans wisely put their civil aviation personnel in uniform. They had been flying all over the world what looked like military machines and personnel, but they were really civilian personnel dressed up. Our Government had done the reverse: starting an Air Transport Command, but he hoped it would be realised that when war ceased the personnel of Air Transport Command should be used for running civil airlines.

On the subject of aircraft, Lord Brabazon said he hoped the machines evolved from bombers would not become known as converted bombers. They were not, and they were quite serviceable, but it was important that new types and new engines should be thought of now. We were always told that we must not disturb the war effort, and that America would be cross if we built such machines. Air transport was either a war help or it was not. If it was not, why was America building so many transport aircraft? If it was, why were we not building any? There were committees to make recommendations, but it was for the Government to implement these recommendations.

Internationalism

VISCOUNT ST. DAVIDS pleaded for an international combine. Every day we saw an amazing example of magnificent international co-operation in the bombers going out on great expeditions. They had already heard of innumerable little squabbles that would arise if we chose any other way. There was going to be a grand free fight for all if things were left as they were.

VISCOUNT ROTHERMERE did not agree that civil aviation should be international. That was not possible until nations gave up their sovereign rights to an international authority. When that happened aviation would, like everything else, be run by that authority. He referred to the fact that Lord Brabazon is chairman of several mysterious committees. He (Lord Brabazon) made speeches critical of the Government, and had various cracks at the Americans. He thought it would be more useful if he (Lord Brabazon) would get up and tell them what his work really is. He deprecated the suggestion of difficulties with America. The article by Mr. Trippe, president of Pan-American Airways, published recently was extremely reasonable. It was not technical difficulties we had to anticipate but political difficulties. He pleaded with Lord Sherwood to bear in mind a London airport within 12 or 15 miles from the centre.

LORD MILFORD welcomed the appointment of Lord Knollys as chairman of B.O.A.C., but thought the task of operating British post-war aviation too great to be undertaken by a monopoly. On the question of subsidies he thought that only facilities such as airports and every possible help to aircraft should form subsidies, and that for the rest there should be payment only for work actually done.

LORD SEMPILL thought a committee as that over which Lord Beaverbrook had recently presided too large and supported the suggestion made by Lord Bennett some time ago that an Empire Air Board should be formed, composed of not more than ten or twelve people.

LORD GIFFORD argued that although technical quality was important, efficient service was even more important, and he hoped Lord Beaverbrook would ensure that the service given on British air lines would be above reproach.

LORD WINSTER welcomed the reference to shipping companies. The interest which shipping companies were now taking in aviation was obviously very considerable, and he would like Lord Beaverbrook to tell them if shipping interests were represented on the recent air conference. He agreed with Lord Milford on subsidies, but pointed out that there might be cases where the granting of a subsidy might make possible the opening up of some new route which would be commercially unremunerative. He thought the recent declaration by President Roosevelt and Mr. Churchill about freedom to alight for refuelling and servicing but not for picking up and setting down passengers disposed of the American claims to rights on American airfields abroad for which they had paid.

VISCOUNT TRENCHARD quoted from the statement by Presi-

AIR TRANSPORT

dent Roosevelt as reported in *The Times* and said he thought the debate that day would have hinged to a great extent around that statement.

THE LORD PRIVY SEAL (Lord Beaverbrook) replied for the Government. He began by making a few observations on post-war air development as he saw it. There were many estimates as to the size of civil aviation. One was 1,000 civil aircraft in Great Britain and another 15,000 aircraft throughout the world. His own estimate was 2,000 aircraft in Britain. He recalled that before the war there were fewer than 500 commercial aircraft in America. In Canada, for which he had figures, the number of air passengers doubled each year. He thought newspapers and mail would be carried by air, but the 2,000 aircraft would not form a solid basis for the production of aircraft after the war. Civil aviation merits were not something that would enable civil aircraft requirements to take up and occupy the slack in manufacturing enterprises when the building of warplanes comes to an end.

Turning to the Brabazon Committee, Lord Beaverbrook said that it had met regularly and its proceedings are before the Ministries concerned. He personally intended to follow the views of the Brabazon Committee in so far as he was required to reach decisions.

Of Empire aviation Lord Beaverbrook said that it was the Government's desire to go forward as an Empire having no differences among themselves. The conference had reached agreement in two and a half days. It was of an informal character and in no way committed the Governments. The Ministers who attended the conference were: Viscount Cranborne; Sir Archibald Sinclair; Lord Leathers; Sir William Jowitt; Lord Cherwell; Mr. Law; Capt. Balfour; Mr. Assheton; The Duke of Devonshire, and himself.

The next stage would be to go forward at once to an international conference. There might be some delay, since it must wait on America and Russia. If the Dominion Governments approved of the conclusions of the two and a half days' conference, we were ready with our plan, an extensive plan and a complete plan. Lord Beaverbrook then recalled the beginning of the wartime transatlantic service.

Coming to the "chosen instrument," Lord Beaverbrook said that the present one was only a monopoly in one sense, the only money paid to it being for carriage of mails. He saw no demand which indicated that the present was the time for making a change. The chosen instrument was tied up with the whole question of private enterprise, and must wait on the decisions taken at the Imperial Conference. Of the suggested international authority, Lord Beaverbrook said:

> "It was decided unanimously that the international air transport authority should be intimately associated with and responsible to any United Nations security organisation which might be established, the air transport authority being, of course, the authority which will be brought into existence if the conference has the happy passage with all the Governments of the Empire which I believe will be the case."

Replying to Viscount Rothermere, Lord Beaverbrook said that he (Viscount Rothermere) was quite right in saying what he wanted. Unfortunately, he did not want it at the right time. When he was a director of Imperial Airways he attended conferences in Washington and Ottawa which lasted from December, 1935, to June, 1936. As a result there was a plan for the North Atlantic for the next fifteen years. Imperial Airways were to fly two trips a week, and Pan American two. The number of passengers on British machines was twenty, and on the American sixty. Later we threw in Bermuda. If this agreement had operated, which it did not, we should have got one-quarter of the North Atlantic traffic and one-third of the Bermuda traffic. That was how Britain would have shared with America. Imperial Airways were not ready, and Pan American insisted on being permitted to fly without waiting for Imperial Airways. Here Viscount Rothermere interposed to remind Lord Beaverbrook that the reason why Imperial Airways could not start was that it was prevented by its charter from buying aircraft outside this country. To this Lord Beaverbrook retorted that if Viscount Rothermere had the drive which he expected in others he might have been able to push through a plan for speeding up the production of the necessary aircraft in Great Britain.

At the recent conference the shipping interests were not represented. It was a discussion between Governments only.

AMERICA GAINS ANOTHER BASE

A SIMPLE ceremony, at the back of which are far-reaching influences on the conduct of aerial warfare in Europe, took place at a very large aircraft base on Thursday, October 21st.

The occasion was the formal handing over of the organisation from the control of the M.A.P. to the U.S. Army Eighth Air Force Service Command.

Air Vice-Marshal C. W. Weedon, Director-General of Repair and Maintenance at M.A.P., was introduced to the assembled company manning the depot by Major General Henry J. F. Miller, Commanding General of the Eighth Air Force Service Command.

Air Vice-Marshal Weedon, in a short, pithy speech, then formally handed over the base to Colonel I. W. Ott, who has been given command. Colonel Ott, in his speech of acceptance, urged that the base be made one of Democracy's arsenals, and dedicated it as a depot in which "workmanship is a creed, precision the rule, accuracy the law, and speed the byword." He concluded: "It can be done and it will be done—God willing."

The station band then played "God Save the King," following with the "Star-Spangled Banner," during which the American flag was hoisted by Colonel Ott to the head of the flag mast.

This concluded the ceremony, the visitors and guests then being conducted on a necessarily brief tour of the engine repair assembly line.

One of the most striking aspects of this base, apart from its size, is the excellent orderliness of the layout and the almost hygienic state of cleanliness, which we were assured by General Miller is a permanent condition, and not something put on for the benefit of the visiting party.

This station, which was organised by M.A.P. and staffed with British civilians, has for some time been used by the American Forces, but will now be completely an American base, totally manned by American personnel.

THE HALIFAX GROUP

WITH a view to giving an insight into the vast organisation which has to be set up in order to deal with the large-scale production of a heavy bomber, members of the industrial Press were recently invited to the works of Handley Page, Ltd.

The number of different manufacturing units were divided into sections or groups for purposes of administration. The visitors had explained to them the character and functions of the various committees and sub-committees and the way in which meetings are held in order to keep all members of the group informed of the latest developments. The repair organisation was explained, as well as the work and functioning of the service department. The parent firm established an Outside Production Office for dealing with such questions as training of workers from the various "daughter" firms, supplying technical information, drawings, jigs and tools; for answering queries and render advice and technical approval.

Each firm in the group may be said to have "dominion status," it being realised that they all had extensive administrative and manufacturing experience.

In addition to representatives of the parent and daughter firms, committee meetings are attended by representatives of the Ministry of Aircraft Production from the various departments concerned.

Changes of a major character, made to meet changing conditions in the field, are discussed at meetings of the principals of the firms in the Halifax Group.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

COCKPIT LAYOUTS

A Plea for Standardisation

I HAVE been flying now for ten years, and my job has entailed flying some fifty-four different types—single, twin- and four-engined, civil and Service, British and American, and an Me 110.

Several times I have had to "teach myself" to fly a modern type, and so I am a strong advocate of standardisation of cockpit layouts. The Royal Air Force have a standard blind flying panel, so why could not manufacturers and their test pilots get together and earn the never-ending gratitude of those who fly?

Here are some of my ideas:—

(*a*) Standard blind flying panel immediately in front of the captain, and not partially obscured by bits of the stick or "spectacles."

(*b*) All other instruments to be the same size and circular in shape and design (not individual manufacturers' preference). Those which read up to 100,000 units to be three-handed, e.g., sensitive altimeter; to 10,000 units to be two-handed, e.g., rev. counters; to 100 or 1,000 units to be single-handed, e.g., oil pressures, thermometer, etc.

(*c*) Individual instruments always to be in the same relative positions on all panels, e.g., oil pressures top right, with oil temperatures immediately below, etc.

(*d*) All instruments to be rotatable in their mountings and set so that the hand (or main hand) is vertical at normal cruising (who cares if the figures are upside down?).

(*e*) Coloured lines painted on the glass (American style) to show permissible limits of operation.

(*f*) Two contacts inside the instrument which can be pre-set at any desired position, and so set that they light a red light on the face of the instrument if the reading rises above or falls below permissible limits.

These suggestions can be elaborated *ad lib.*, but will give some idea of what I am driving at. My contention is that the *pilot* does not care a tuppenny cuss if the units he uses are pounds, kilogrammes, miles, versts, ells, okes or maunds; if "the right figure on the dial is 100," or, better still, "that needle should be upright and it mustn't lean over either side more than that green line shows," that is all he cares about. Also, the pilot would love to know that he could find the carburettor intake temperature on the bottom left of the facia board for the sole reason that that is where it always is.

Now this standardisation and simplification seems straightforward to me, or am I "just a pilot who doesn't appreciate? . . ."

"AGED."

BOMBER ARMAMENT

Day and Night Bombers Cannot be Compared

I HAVE followed with great interest the discussion on bomber armament which has been taking place in recent weeks through the Correspondence columns of *Flight*, and would like, if I may, to reply to some points raised in the issue of October 14th.

It is certainly not through ignorance that the British do not use the .5in. gun, as Mr. Poshefko seems to imagine. As to his remarks about the .303in. gun, the service record of this weapon, which was used as our standard fighter armament throughout the Battle of Britain and has been widely used with equal success since, is sufficient in itself to prove the inaccuracy of his statements.

As I said in my letter published on July 15th, experience has shown that four .303in. guns in power-operated turrets *are* adequate protection against such fighter opposition as is met at night, and the advantages gained, if any, by installing two .5in. guns in their place would be outweighed by the loss in production which would result from the change-over.

Further, I agree with Mr. J. Bamsey when he says that the greater percentage of our night losses are due to flak rather than fighters.

Mr. Poshefko goes on to defend the American policy of day bombing with "heavies." Nobody is doubting the wisdom of this policy. There is no doubt that the U.S.A.A.F. is doing a superb job, and such people as Mr. A. T. Henshaw, who doubt the accuracy of high-level bombing, should study carefully the photographs published in the Press; an especially good one was shown in *Flight* of October 21st of the Marienburg aircraft plant while and after the Fortresses had paid it a visit.

Whereas we recognise the value of such work, let us have the facts correct. Mr. Poshefko states that the Fortress can carry ten tons (presumably American tons) of bombs, although without the full complement of guns. This may be so, but in practice it rarely carries much more than three British tons except over very short distances.

Finally, Mr. Poshefko says that "American aircraft are built for their special purposes." I believe I am right in saying that the Fortress and Liberator were originally designed for long-range patrols over the sea, and for this reason their petrol load is not interchangeable with their bomb load. Even if this is not so, is he suggesting that America is the only country to build specialist aircraft? The Lancaster, Mosquito, Typhoon and Spitfire were all built for the purpose for which they are being used, and, furthermore, are supreme in their respective classes. Certainly, Britain has no heavy day bomber, but then America has no heavy night bomber.

In conclusion, there is one point which I think has been largely overlooked throughout the discussion, and that is that there is no true comparison between British night bombing and American day bombing. The R.A.F. attacks area targets requiring "block bombing" (e.g., industrial areas), whereas the U.S.A.A.F. attacks small isolated targets requiring precision bombing (e.g., factories). To compare one with the other is like comparing chalk with cheese.

It is, therefore, illogical to base arguments about bomber armament upon such a comparison. The point is that the Fortress and Liberator do *their* job as efficiently as the Lancaster, Halifax and Stirling do theirs. All are splendid machines, worthy of the gallant crews who fly them.

C. E. COWEN.

Another Reply to Mr. Poshefko

THE letter in *Flight* of October 14th from J. A. Poshefko, of the U.S.A., contains several statements which I cannot let pass without comment.

First, his statement that .303in. machine guns are no good for shooting down metal-covered aircraft is quite ridiculous. Where the .303in. fails is against armour plate, but that applies equally well to the .5in. guns also, I believe.

Secondly, he states that the Fortress II can carry 10 tons of bombs, forgetting that a U.S. ton and a British ton are somewhat different.

Thirdly, his statement that, by using high-altitude bombers, air crews and bombers are saved. What has he to say about the raid on Schweinfurt, in which, even assuming that numbers were roughly equal, the U.S.A.A.F. lost an almost equal number of bombers as in our heaviest raids, and yet only dropped a quarter of the bomb tonnage of our machines.

Lastly, he asks, "How good can bombing be at night?" and writes, "Thousands of tons of bombs would be wasted on shrubbery and countryside." I assume that he has not seen the photographs taken by the R.A.F. of the damage caused by our bombers, as, if he had, I rather think that his ideas would be a little different. Then, again, our bombers drop far heavier bombs than the U.S. types are capable of dropping, and thus the bomb does not have to land quite so near its target to be sure of doing some damage.

I should also like to challenge the statement made by "Perspex" in his letter in the same issue. As our population is about half that of Germany, and the tonnage that we have dropped on them is slightly under double the tonnage that they have dropped on us, he maintains that we have not yet bombed them as heavily as they have us. I disagree. If they have twice the population of us to build and fly bombers, and yet have only dropped half the bomb tonnage, surely this means that we have bombed them four times as heavily in comparison?

E. WATTS.

Gas Turbines and Jet Propulsion for Aircraft

By G. GEOFFREY SMITH, M.B.E.

A second edition of the above booklet is available from "Flight" publishing offices. The new work consists of ten chapters and includes many illustrations. Price 3/6 plus 3d. post.

CAVALCADE : A crashed Lancaster moves off to a repair depot in line astern.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News and Announcements

Appointments

Air Comdre. C. B. S. SPACKMAN, D.F.C., has been appointed Air Officer in Charge of Administration, Fighter Command, with acting rank of Air Vice-Marshal.

Air Vice-Marshal Spackman had been Deputy Air Officer in Charge of Administration, Fighter Command, since January, 1943. Before that he was Senior Air Staff Officer at H.Q. of a group in Fighter Command, having previously commanded No. 67 O.T.U. since April, 1942.

Air Vice-Marshal M. THOMAS, C.B.E., D.F.C., A.F.C., has been appointed Air Officer Commanding No. 23 Group (Flying Training).

Air Vice-Marshal Thomas was Senior Air Staff Officer at Flying Training Command and had previously been Director of Technical Training at the Air Ministry and Senior Air Staff Officer at a bomber group.

Air Vice-Marshal H. V. CHAMPION DE CRESPIGNY, C.B., M.C., D.F.C., has been appointed Air Officer Commanding headquarters of a Flying Training Group.

Air Vice-Marshal Champion De Crespigny was Air Officer Commanding A.H.Q., Iraq and Persia.

Promotions

GENERAL DUTIES BRANCH

Air Vice-Marshal (temp.) M. B. FREW, C.B., D.S.O., M.C., A.F.C., is granted the rank of Air Comdre. (war subs.), September 16th, 1943.

Air Comdre. (temp.) J. A. GRAY, C.B.E., D.F.C., G.M., is granted the rank of Group Capt. (war subs.), September 1st, 1943.

Awards

THE KING has been graciously pleased to approve the following awards, in recognition of gallantry displayed in flying operations against the enemy :—

Bar to Distinguished Service Order

Act. Wing Cdr. J. R. D. BRAHAM, D.S.O., D.F.C., R.A.F., No. 14 Sqn.—Since being awarded a second Bar to the Distinguished Flying Cross, Wing Cdr. Braham has undertaken many sorties at night, during which he has destroyed a further five enemy aircraft. He is a brilliant leader, whose exceptional skill, gallantry and unswerving devotion to duty have been reflected in the fine fighting qualities of the squadron which has obtained notable successes.

Act. Wing Cdr. J. E. JOHNSON, D.S.O., D.F.C., R.A.F.V.R.—Since being awarded the Distinguished Service Order this officer has destroyed a further seven enemy aircraft and shared in the destruction of another. He is a relentless fighter whose brilliant leadership and outstanding skill have inspired all with whom he has flown. Within a period of two months Wing Cdr. Johnson led large formations of aircraft on very many sorties, during which 27 hostile aircraft were shot down and a large number were damaged.

Distinguished Service Order

Wing Cdr. J. MCLAUGHLIN, D.F.C., R.A.F., No. 144 Sqn.—Wing Cdr. McLaughlin has completed many sorties. He is a first-class leader, whose great skill and tenacity have been reflected in the meritorious work accomplished by the squadron he commands. His example of zeal and devotion to duty has been highly commendable.

Act. Wing Cdr. R. E. BAILEY, D.F.C., R.A.F.O., No. 466 (R.A.A.F.) Sqn.—This officer has completed a large number of sorties, many of them since being awarded the Distinguished Flying Cross. Wing Cdr. Bailey has displayed outstanding tenacity, and has consistently pressed home his attacks with great vigour. He is an inspiring leader, whose great skill, boundless energy and courageous example have contributed in a large measure to the high standard of operational efficiency of the squadron he commands. Wing Cdr. Bailey has rendered impressive service.

F/O. T. Jonsson, an Icelander in the R.A.F., who received the D.F.M. at a recent investiture at Buckingham Palace.

Act. Wing Cdr. K. H. BURNS, D.F.C., R.A.F.O., No. 97 Sqn.—This officer has participated in a large number of sorties, involving attacks on dock installations and industrial centres in Germany and important targets in Italy. His efforts throughout have been characterised by an inflexible determination to achieve success. On more than one occasion his aircraft has been damaged by enemy action, but each time his persistence and skill have enabled him to reach and bomb his target. Wing Cdr. Burns has displayed high qualities of leadership, courage and devotion to duty.

Act. Wing Cdr. W. V. CRAWFORD COMPTON, D.F.C., R.A.F.V.R.—Since being awarded a Bar to the Distinguished Flying Cross, this officer has participated in a large number of sorties over enemy territory. By his masterly leadership, exceptional skill and gallant example, he has imbued the squadrons he commands with rare zest for battle, combined with a high standard of operational efficiency. Wing Cdr. Crawford-Compton, who has destroyed at least 13 hostile aircraft and damaged several others, has rendered most valuable service.

Act. Wing Cdr. R. S. C. WOOD, D.F.C., R.A.F.O., No. 13 Sqn.—Since being awarded the Distinguished Flying Cross, this officer has completed many sorties, including attacks on well-defended targets in the Ruhr area. His work has been of a high order throughout, and has set a standard worthy of emulation. By his skilful leadership, sound judgment and initiative, Wing Cdr. Wood has contributed materially to the many successes obtained by his squadron.

Sqn. Ldr. T. O. PRICKET, D.F.C., R.A.F.O., No. 103 Sqn.—Since being awarded the Distinguished Flying Cross, this officer has completed many sorties involving attacks on targets in the Ruhr area and objectives at Spezia, Milan and Turin in Italy. Sqn. Ldr. Prickett has executed his missions with outstanding determination, and his fine record of achievement is a worthy tribute to his superb skill and fine fighting qualities. He is a first-class leader whose example has proved inspiring.

Act. Sqn. Ldr. F. B. SLADE, R.A.F., No. 12 Sqn.—This officer has displayed outstanding ability and unswerving devotion in the execution of operational tasks. He completed very many sorties in the Middle East theatre, achieving much success. Since his return to this country, Sqn.

Ldr. Slade has undertaken numerous sorties against various targets in Germany and Italy. His ideal leadership and unconquerable spirit have set an example worthy of the highest praise.

Act. Flt. Lt. P. R. COLDWELL, D.F.M., R.A.A.F.V.R., No. 7 Sqn.—Flt. Lt. Coldwell has completed a large number of sorties, many of them to far distant targets in Germany, and often against heavy opposition. He is a navigator of exceptional ability, and his work, carefully planned and brilliantly executed, has been reflected in the repeated successes obtained. Flt. Lt. Coldwell is a most valuable member of the squadron, and his praiseworthy qualities have set a high standard.

Bar to Distinguished Flying Cross

Act. Sqn. Ldr. R. N. B. STEVENS, D.F.C., R.A.A.F., No. 3 Sqn.—In August, 1943, Sqn. Ldr. Stevens flew the leading aircraft of a formation which attacked shipping in the harbour at Milazzo. In spite of intense anti-aircraft fire, the attack was pressed home from a low level and two ships, six barges and a large flying boat were destroyed. By his skilful leadership and outstanding determination, Sqn. Ldr. Stevens contributed materially to the successes obtained.

Act. Wing Cdr. V. J. WHEELER, M.C., D.F.C., R.A.F.V.R., No. 157 Sqn.—This officer has led the squadron on very many sorties during which locomotives and other targets on the ground have been attacked with telling effect. Much of the success achieved can be attributed to Wing Cdr. Wheeler's inspiring leadership and skill. His courageous example has been worthy of great praise.

F/O. J. D. RAE, D.F.C., R.N.Z.A.F., No. 485 (N.Z.) Sqn.—F/O. Rae is an outstanding and determined pilot. He has undertaken many sorties, displaying gallant leadership and great skill. Within recent weeks, F/O. Rae has shot down four enemy aircraft, bringing his total victories to at least eleven. He has displayed exceptional keenness and devotion to duty.

Flt. Lt. O. R. MAHESON, D.F.C., R.A.F.V.R., No. 83 Sqn.—In air operations, this officer has displayed courage and fortitude of a high order.

Distinguished Flying Cross

Sqn. Ldr. W. B. W. GRACEY, A.A.F., No. 144 Sqn.
Flt. Lt. P. J. KELLEY, R.A.F.V.R., No. 683 Sqn.
Act. Flt. Lt. B. G. HARRIS, R.A.A.F., No. 3 Sqn.
F/O. A. R. D'A. CLUTTERBUCK, R.A.F.V.R., No. 58 Sqn.
F/O. E. S. DICKS-SHERWOOD, R.A.F.V.R.A., No. 92 Sqn.
F/O. R. J. FOSTER, R.A.F.V.R., No. 108 Sqn.
F/O. M. F. NEWTON, R.A.F.V.R., No. 108 Sqn.
F/O. H. WOOLSTENCROFT, R.A.F.V.R., No. 144 Sqn.
Flt. Lt. G. A. SAWTELL, R.A.F.V.R., No. 58 Sqn.
F/O. R. W. MARSHALL, R.A.F.V.R., No. 58 Sqn.
Act. Wing Cdr. G. R. PARR, R.A.F.V.R., No. 256 Sqn.
Sqn. Ldr. A. W. MACK, R.A.F.O., No. 605 Sqn.
Flt. Lt. D. G. ANDREWS, R.A.A.F., No. 453 (R.A.A.F.) Sqn.
Flt. Lt. N. R. FOWLOW, R.C.A.F., No. 421 Sqn.
F/O. H. E. WHITE, R.A.F.V.R., No. 141 Sqn.
Act. W/O. L. H. WRIGHT, R.A.F.V.R., No. 100 Sqn.
Flt. Lt. L. C. KINGSBURY, R.A.F.O., No. 218 Sqn.
Act. Flt. Lt. J. A. DIXON, R.A.F.V.R., No. 214 Sqn.
Act. Flt. Lt. A. E. H. PARSONS, R.A.F.V.R., No. 44 Sqn.
F/O. C. G. PASCOE, R.A.F.V.R., No. 44 Sqn.
P/O. W. B. HAMILTON, R.C.A.F., No. 218 Sqn.
P/O. G. L. S. MCHARDY, R.A.F.V.R., No. 100 Sqn.
P/O. J. T. MADDOCK, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
P/O. P. W. MANNING, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
P/O. W. R. MARTIN, R.A.A.F., No. 466 (R.A.A.F.) Sqn.
P/O. J. A. C. MUNRO, R.A.F.V.R., No. 106 Sqn.
P/O. G. B. MURTOUGH, R.A.A.F., No. 50 Sqn.
P/O. R. W. NIXON, R.C.A.F., No. 35 Sqn.
P/O. J. O. PENNINGTON, R.A.F.V.R., No. 44 Sqn.
P/O. L. W. QUICK, R.A.F.V.R., No. 196 Sqn.
P/O. J. H. RATCLIFFE, R.A.F.V.R., No. 103 Sqn.
P/O. R. G. SHARLAND, R.A.F.V.R., No. 51 Sqn.

SERVICE AVIATION

P/O. W. D. SMELLIE, R.N.Z.A.F., No. 214 Sqn.
P/O. G. STEVENS, R.N.Z.A.F., No. 10 Sqn.
P/O. R. G. F. STEWART, R.A.F.V.R., No. 156 Sqn.
P/O. R. T. STRAKER, R.A.F.V.R., No. 12 Sqn.
P/O. S. C. SUKTHANKER, R.A.F.V.R., No. 83 Sqn.
P/O. C. SUTTOR, R.A.A.F., No. 207 Sqn.
P/O. F. TAYLOR, R.A.F.V.R., No. 77 Sqn.
P/O. J. T. TAYLOR, R.A.F.V.R., No. 49 Sqn.
P/O. R. C. TAYLOR, R.A.F.V.R., No. 426 (R.C.A.F.) Sqn.
P/O. J. S. THOMSON, R.C.A.F., No. 43 (R.C.A.F.) Sqn.
P/O. L. H. TOLCHARD, R.A.F.V.R., No. 49 Sqn.
P/O. P. C. H. TRIPP, R.C.A.F., No. 76 Sqn.
P/O. J. A. WEBER, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
P/O. F. J. WHEELER, R.A.F.V.R., No. 90 Sqn.
P/O. G. B. WHITE, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
W/O. H. ALLAN, R.A.F.V.R., No. 100 Sqn.
W/O. W. S. CAMPBELL, R.A.F.V.R., No. 100 Sqn.
W/O. W. H. CUTTS, R.A.F., No. 7 Sqn.
W/O. R. DICK, R.A.F.V.R., No. 103 Sqn.
W/O. H. DUTTON, R.A.F., No. 44 Sqn.
W/O. E. T. ENGLISH, R.C.A.F., No. 57 Sqn.
W/O. T. MCC. R. KEILL, R.A.F.V.R., No. 106 Sqn.
W/O. G. L. KENNEDY, R.N.Z.A.F., No. 429 (R.C.A.F.) Sqn.
W/O. J. W. PRINCE, R.A.F., No. 51 Sqn.
W/O. J. TOUGH, R.A.F., No. 57 Sqn.
Act. W/O. F. F. POWELL, R.A.F.V.R., No. 103 Sqn.
Act. W/O. D. W. RUDGE, R.A.F., No. 103 Sqn.
Act. Wing Cdr. R. B. THOMSON, D.S.O., A.A.F., No. 206 Sqn.
Act. Flt. Lt. J. F. CLARK, R.A.F.V.R., No. 206 Sqn.
F/O. J. L. HUMPHRIES, R.A.F.V.R., No. 206 Sqn.
F/O. C. FLETCHER, R.A.F.V.R., No. 682 Sqn.
Sqn. Ldr. B. H. MOFFIT, A.F.C., R.C.A.F.
W/O. 2nd Cl. C. E. SPENCE, R.C.A.F.
Act. Wing Cdr. D. C. SANDEMAN, R.A.F.V.R., No. 18 Sqn.
Act. Sqn. Ldr. H. W. G. ANDREWS, R.A.F.V.R.
Act. Sqn. Ldr. D. LINLEY, R.A.F.V.R., No. 221 Sqn.
Act. Sqn. Ldr. P. PETERS, R.A.F.O., No. 142 Sqn.
Act. Sqn. Ldr. L. H. STYLES, R.A.F., No. 153 Sqn.
Lt. C. KAVANAGH, S.A.A.F., No. 40 (S.A.A.F.) Sqn.
Lt. M. E. S. ROBINSON, S.A.A.F., No. 1 (S.A.A.F.) Sqn.
Flt. Lt. J. FENWICK-WEBB, R.A.F.V.R., No. 142 Sqn.
Flt. Lt. N. R. KING, R.N.Z.A.F., No. 162 Sqn.
Flt. Lt. N. H. D. RAMSAY, R.A.F.V.R., No. 1435 Sqn.
Flt. Lt. R. J. WATSON, R.N.Z.A.F., No. 162 Sqn.
Flt. Lt. M. D. WYLIE, R.A.F.V.R., No. 260 Sqn.
Act. Flt. Lt. P. G. ADAMS, R.A.A.F., No. 95 Sqn.
Act. Flt. Lt. H. V. HORNER, R.A.A.F., No. 204 Sqn.
Act. Flt. Lt. E. LE P. LANGLOIS, R.A.A.F., No. 150 Sqn.
Act. Flt. Lt. D. K. THORBURN, R.A.F.V.R., No. 15 Sqn.
F/O. C. S. BAMBERGER, R.A.F.V.R., No. 93 Sqn.
F/O. S. F. BROWNE, R.N.Z.A.F., No. 93 Sqn.
F/O. A. R. CARTER, R.C.A.F., No. 154 Sqn.
F/O. P. H. C. HANBURY, R.A.F.V.R., No. 18 Sqn.
F/O. J. F. W. LEDBETTER, R.A.A.F., No. 14 Sqn.
F/O. W. LEWIS, R.N.Z.A.F., No. 172 Sqn.
F/O. W. F. MATTEN, R.A.F.V.R., No. 162 Sqn.
P/O. F. MASON, R.A.F.V.R., No. 142 Sqn.

Conspicuous Gallantry Medal (Flying)

Flt. Sgt. O. H. WHITE, R.N.Z.A.F., No. 75 (N.Z.) Sqn.—These airmen were pilot, flight engineer and mid-upper gunner respectively of an aircraft detailed to attack Berlin one night in August, 1943. When nearing the target, the aircraft was illuminated by the searchlights and repeatedly hit by anti-aircraft fire, sustaining damage to the port main plane. Despite this, Flt. Sgt. White continued his bombing run, but was attacked by a fighter. The bomber was hit by the attacker's gunfire, which wrecked the rear turret, killing the gunner, and causing the aircraft to dive out of control directly over the target. Nevertheless, Flt. Sgt. White released his bombs and succeeded in regaining control. Considerable height had been lost, but this pilot coolly and skilfully flew clear of the target area and course was set for base. Much essential equipment had been rendered useless, but, with unerring skill, Flt. Sgt. White flew the badly damaged bomber to base. During the return flight Sgts. Worledge and Collins assisted their pilot in every way within their power, and proved themselves most valuable members of the aircraft crew, displaying great courage and resource.

Flt. Sgt. A. W. J. LARDEN, R.C.A.F., No. 218 Sqn.—One night in August, 1943, this airman was the bomb aimer of an aircraft detailed for an operation against Turin. Whilst over the city the bomber was subjected to accurate bursts of fire from an enemy fighter. The windscreen was shattered, the front and rear turrets were put out of action, while three engines were hit, one of them being rendered useless. The navigator was killed, and the pilot was wounded and lay slumped over the controls. He was removed from his position, and Flt. Sgt. Larden coolly took over the controls. The aircraft was down to 3,000 feet, and the bombs were released. Flt. Sgt. Larden realised that he would be unable to gain height sufficiently to cross the Alps, so decided to make for North Africa. Without navigator and flying a crippled bomber, the situation was serious, but, displaying outstanding skill and determination, this airman succeeded in reaching an airfield in Tunisia. Although he had never previously landed an aircraft, Flt. Sgt. Larden came down perfectly with the undercarriage retracted. In the face of extreme peril, this airman displayed courage, coolness and resource of a high order.

Flt. Sgt. D. REES, R.A.A.F., No. 460 (R.A.A.F.) Sqn.—One night in August, 1943, this airman displayed superb skill when piloting an aircraft detailed for an operation against Milan. During the outward flight, two of the bomber's engines became defective, but Flt. Sgt. Rees continued to his far-distant target and bombed it, afterwards flying the disabled aircraft to base. On the night of August 17th, 1943, Flt. Sgt. Rees took part in an attack on a target at Peenemunde. Whilst over the target area, the aircraft was attacked by a fighter. The attack was driven off, but the bomber had been repeatedly hit. The starboard tail plane and the trimming tabs were shot away, one engine and the hydraulic system were damaged, while one of the petrol tanks was pierced and its contents lost. Despite this, Flt. Sgt. Rees coolly and skilfully flew the damaged bomber to base. This airman, who has completed many sorties, has displayed courage and tenacity of a high degree.

Distinguished Flying Medal

Sgt. C. A. WORLEDGE, R.A.F., and Sgt. T. J. COLLINS, R.A.F.V.R., both of No. 75 (N.Z.) Sqn.—For citation see Flt. Sgt. White, C.G.M.

Sgt. B. E. MITCHELL, R.C.A.F., No. 58 Sqn.
Sgt. J. A. WOWK, R.A.F.V.R., No. 144 Sqn.
Sgt. G. E. RUSSELL, R.A.F.V.R., No. 78 Sqn.
Flt. Sgt. A. J. RHODES, R.N.Z.A.F., No. 90 Sqn.
Flt. Sgt. A. C. SMITH, R.A.F.V.R., No. 137 Sqn.
Sgt. J. L. CLARK, R.A.F.V.R., No. 156 Sqn.
Cpl. H. KNELSON, R.C.A.F.

THE KING has been graciously pleased, on the advice of Canadian Ministers, to approve the following award:—

M.B.E. (Mil.)

F/O. J. A. MUIR, R.C.A.F.

THE KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished service:—

Military Cross

Flt. Lt. A. C. LANGHAM, R.A.F.V.R.
F/O. T. DUN, R.A.F.V.R.

Military Medal

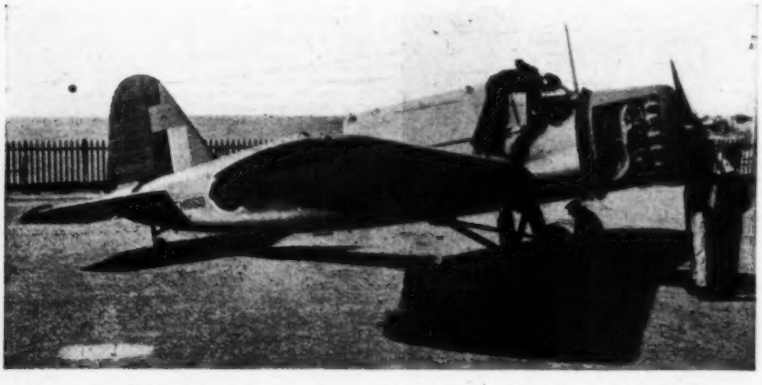
Sgt. L. PEARMAN, R.A.F.V.R., No. 101 Sqn.
Cpl. J. BOYD.
A/C.1 R. QUIGLEY.

THE KING has been graciously pleased to approve the following awards:—

B.E.M. (Mil.)

Flt. Sgt. W. MACKIE, R.A.A.F., No. 461 (R.A.A.F.) Sqn.—In May, 1943, Flt. Sgt. Mackie was a member of the crew of a Sunderland flying boat which crashed into the sea while engaged on an air/sea rescue mission. The second pilot of the aircraft was thrown from the wreckage, and, being badly injured, floated away from the rest of the crew, who were standing on the mainplane, endeavouring to inflate the dinghy. Flt. Sgt. Mackie dived into the water and, after reaching his companion, supported him for 30 minutes until rescued by those who had inflated the dinghy and manœuvred it to the spot.

Sgt. R. A. C. GRIMSHAW, R.A.F., and Cpl. A. E. MILLS, R.A.F.—In May, 1943, a Wellington aircraft crashed and caught fire. The pilot was able to extricate himself, but the remaining six members of the crew were all in the wreckage in a dazed or injured condition. Ammunition was exploding, and it was not known whether the aircraft carried bombs. Acting with great promptitude and without waiting for the fire tender to get into full operation and protect them with foam, these airmen, with the assistance of three other airmen, crawled into the burning wreckage and succeeded in bringing the six members of the bomber's crew to safety. They displayed a complete disregard of their personal



A Vought-Sikorsky Kingfisher (VS-310) at a Fleet Air Arm Station. The Kingfisher is a two-seater reconnaissance aircraft with a 450 h.p. P. and W. Wasp Junior engine. Maximum speed 171 m.p.h. Landing speed 55 m.p.h.

safety in effecting this rescue, and in so doing undoubtedly saved the lives of the crew.

Sgt. G. W. L. MATHEWS, R.A.F.—In June, 1943, a Wellington aircraft crashed in a field on the edge of an airfield. Sgt. Mathews immediately made his way to the wreckage, which was enveloped in flames. Disregarding his own safety, he succeeded in extricating the pilot from his seat in the blazing aircraft and then returned to help the wireless operator, who was trapped. Ammunition and pyrotechnics were now exploding, but, ignoring the danger, this airman, with the assistance of three others who worked under his directions, pulled away the burning wreckage and Sgt. Mathews clambered inside the fuselage. After determined attempts he was able to ease the wireless operator into a position from which he was carried away to safety. The prompt and courageous action of Sgt. Mathews, who had worked until he was almost exhausted, saved the lives of the pilot and wireless operator.

Sgt. J. MORRISON, R.A.F.—When taking off one morning in June, 1943, a Blenheim aircraft crashed into two vehicles, one a motor tanker, containing 2,000 gallons of petrol. The aircraft caught fire, and the tanker, which had burst, caught alight and burned furiously. Sgt. Morrison, who was in a nearby hut, rushed to the scene and saw an airman lying in the flames. Dashing into the fire, the sergeant seized the airman and pulled him clear, then beat out the flames on his clothing with some overalls. Sgt. Morrison himself received burns in the process.

Sgt. N. WEBB, R.A.F.—Sgt. Webb was navigator in an aircraft which, with ammunition aboard, crashed in June, 1943. Flames rose high above the pilot's cockpit and the pilot was so affected by flames that he was unable to extricate himself from the aircraft. Sgt. Webb went to his companion's aid and, climbing on to a wing and standing over a petrol tank from which leaking petrol was burning, he assisted the pilot to safety. Immediately the two airmen were clear, the tank exploded. Sgt. Webb displayed courage of a high order and undoubtedly saved the life of the pilot.

L.A/C. I. WILLIAMS, R.A.F.—One night in May, 1943, a Stirling aircraft, which had been damaged during an operational mission, crashed and burst into flames about three miles from an R.A.F. Station. L.A/C. Williams, who was in charge of the Station fire tender, proceeded immediately to the aircraft, which was burning furiously. The pilot of the bomber had been thrown from his seat and was lying on the ground beneath the starboard wing, and the engines, which were blazing and liable to collapse. He was seriously injured and unable to assist himself. With complete disregard of his own safety, L.A/C. Williams plunged into the burning wreckage and succeeded in dragging the pilot to safety only a few seconds before the wing collapsed. At great risk this airman saved the life of the pilot.

Awards of Foreign Decorations

THE KING has granted unrestricted permission for the wearing of the undermentioned decorations, conferred upon the personnel indicated, in recognition of valuable services rendered in connection with the war:—

Conferred by His Majesty the King of the Hellenes

Commander in the Royal Order of George I (with swords)

Air Vice-Marshal M. B. FREW, C.B., D.S.O., M.C., A.F.C., R.A.F.
Lt-Col. S. A. MELVILLE, O.B.E. S.A.A.F.

Conferred by Her Majesty the Queen of the Netherlands

Grand Cross of the Order of Orange Nassau

Air Chief Marshal Sir F. W. BOWHILL, G.B.E., K.C.B., C.M.G., D.S.O., R.A.F.

Officer of the Order of Orange Nassau

Sqn. Ldr. M. A. PAYN, R.A.F.O.

Conferred by the President of the Republic of Poland

Grand Cross of the Order of Polonia Restituta

Air Chief Marshal Sir A. W. TEDDER, G.C.B., R.A.F.

Order of Polonia Restituta
Grand Officer

Air Marshal Sir W. L. WELSH, K.C.B., D.S.C., A.F.C., R.A.F.
Act. Air Comdre. L. F. PENDRED, M.B.E., D.F.C., R.A.F.

Commander

Act. Air Comdre. T. N. McEVOY, O.B.E., R.A.F.
Group Capt. L. W. JARVIS, R.A.F. (ret.).
Group Capt. R. B. JORDAN, D.F.C., R.A.F.

Officer

Wing Cdr. F. W. MOXHAM, A.F.C., R.A.F.
Wing Cdr. F. B. TOMKINS, A.F.C., R.A.F.
Act. Wing Cdr. H. P. R. SMITH, M.B., B.Ch., M.R.C.S., L.R.C.P., R.A.F.
Hon. Wing Cdr. E. N. GROWDON, R.A.F.
Act. Sqn. Ldr. H. PERRING, R.A.F.O.

Conferred by the Belgian Government

Military Cross, First Class

Group Capt. A. ELLIS, C.B.E., R.A.F.
Sqn. Ldr. R. E. WATTS, A.F.C., R.A.F.

Roll of Honour

Casualty Communiqué No. 298.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "On active service" includes ground, casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list 101 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—F/O. K. Arthur; Sgt. L. J. V. Cotton; P/O. M. H. Davies; Sgt. P. A. Fricker; Flt. Lt. D. C. Moon; P/O. T. D. O'Boyle; Sgt. W. G. Onion; Flt. Lt. A. R. Short; P/O. F. Street; Sgt. E. A. White.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. W. E. Baker; Sgt. H. Bate; Sgt. G. J. Bentley; Sgt. S. Boden; Sgt. J. Callan; Sgt. P. M. Corley; Sgt. C. A. Davey; Sgt. H. F. Davies; Sgt. G. J. Dean; P/O. J. R. Diack; Sgt. J. W. Epathite; Sgt. R. H. Frankland; Sgt. P. C. Hind; Sgt. T. Hodgson; Sgt. A. C. Hole; Sgt. N. B. Johnstone; Flt. Sgt. C. C. MacColl; F/O. M. A. Nias; F/O. C. M. Parsons; P/O. G. R. Powell; Sgt. L. G. Powell; Sgt. P. Sandover; Sgt. A. M. Templeton; Sgt. J. R. Walker; Sgt. G. B. Wilkinson; Sgt. D. B. Yates.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. J. A. G. Anscomb; F/O. A. D. Bell; Sgt. R. J. Benn; Sgt. S. J. Berry; Sgt. W. H. Bevan; Act. Flt. Lt. A. Breakey; Sgt. A. M. Coakey; Sgt. G. A. F. Couzens; Sgt. J. H. Dyer; Flt. Sgt. C. E. Gray; Flt. Sgt. S. H. Greene; Sgt. A. V. D. Hines; Sgt. H. C. D. Holmes; Sgt. E. H. Holmes; Sgt. J. W. Layton; Sgt. A. C. McBay; P/O. J. McCormack; Sgt. A. E. Mackrill; Sgt. A. R. Maddison; P/O. W. H. Major; Sgt. A. Marshall; Sgt. E. Marshall; W/O. C. S. Maxfield; Flt. Sgt. F. J. Miles; Sgt. C. Naylor; F/O. F. A. S. Patterson; Sgt. G. Pettinger; Flt. Sgt. J. A. Rowley; Flt. Sgt. A. W. Simpson; Sgt. C. N. Stansbury; Sgt. N. Van Gelder; Sgt. J. Vosper; Sgt. J. Williams; Sgt. F. Wood; Sgt. T. A. Yates.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. S. H. Porteous.

WOUNDED OR INJURED IN ACTION.—Sgt. W. J. Dark; Sgt. J. Geddes; F/O. H. I. Matthey; F/O. C. B. Urwin.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. A. L. Aaron.

PREVIOUSLY REPORTED WOUNDED OR INJURED IN ACTION, NOW REPORTED DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. G. D. McM. Owen.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. H. S. Airey; P/O. V. Baker; Flt. Sgt. W. C. Coates; Flt. Sgt. M. L. Glynn; Sgt. J. A. E. Newland; Sgt. A. P. Power; W/O. J. Roberts; Sgt. L. Spurr; Sgt. W. J. Vaughan.

MISSING.—Sgt. G. L. Abrahams; P/O. W. B. Angus; Sgt. G. A. Angwin; F/O. H. L. Ashley; Sgt. F. A. Bartlett; Wing Cdr. W. S. Barton, D.F.C.; Sgt. J. A. Beck; Flt. Sgt. S. B. Billing; Sgt. R. Boulton; Sgt. W. L. Boundy; Sgt. K. T. Brentnall; Sgt. R. J. Broad; P/O. L. C. Brown; Sgt. W. Bruce; Flt. Sgt. C. S. Burgess; Flt. Sgt. B. J. Buxton; Sgt. D. J. Carrington; P/O. D. C. Challis; Sgt. J. R. Clark; Sgt. P. R. Collins; Sgt. R. K. Cox; Act. Wing Cdr. L. Crooks, D.S.O., D.F.C.; F/O. M. S. D'Abadi; Flt. Sgt. A. Davie; F/O. T. Downing; Sgt. H. W. S. Ducklin; Sgt. E. W. Evans; Cpl. W. Friend; Sgt. W. B. Gilchrist; P/O. L. W. Gospel; Sgt. J. J. Griffin; Sgt. J. Griffiths; Sgt. L. T. Halson; Sgt. C. Hedge; Sgt. J. C. Hislop; Sgt. F. A. Hitchcock; P/O. R. W. Holdsworth; Sgt. R. F. Holdaway; Flt. Sgt. J. Howes; Sgt. A. E. Huntingford; Sgt. N. J. Huxley; Sgt. R. James; Sgt. J. M. Jones; F/O. D. L. P. Justice; Sgt. D. Kennedy; P/O. L. G. Kennett; Sgt. F. J. Lane; P/O. C. Narnach; Sgt. R. A. Lewis; Sgt. I. Llewellyn; Sgt. K. Lyne; Sgt. R. G. McCallum; Flt. Sgt. S. McCormick; Flt. Sgt. R. McKillop; P/O. P. V. Matthews; Sgt. N. R. Mitchell; F/O. P. T. Muirhead, D.F.C.; Sgt. J. G. Noblett; P/O. S. Oliver; F/O. E. H. Ottway; Sgt. S. J. V. Philo; Sgt. G. F. Poynter, Sgt. G. E. Prince; Sgt. A. W. Ready; Sgt. J. H. Richards; Sgt. H. F. Rora; Sgt. F. E. Shefford; Sgt. J. B. L. Smith; Sgt. J. Thomas; Flt. Sgt. J. McK. V. Thomson; Sgt. R. E. Thompson; Sgt. S. Trevett; Sgt. J. R. Vint; Sgt. T. E. Wadeson; Sgt. N. R. Waite; Sgt. E. Williams; Sgt. G. Wood.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—F/O. P. G. Scorer; Act. Sqn. Ldr. C. W. P. Selby; Sgt. J. P. Taylor; Sgt. B. C. Woodroofe.

KILLED ON ACTIVE SERVICE.—Flt. Lt. T. Aldt; Sgt. L. A. Bell; A/C.1 K. H. C. Browne; Sgt. H. Coupe; W/O. S. J. Darrell; Sgt. F. W. Fitch; Sgt. R. F. Higgs; Sgt. H. M. Male; Sgt. J. Robson; Flt. Sgt. G. H. Soully; Act. Group Capt. D. W. Stannard; L.A/C. G. O. G. Worrall.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—A/C.1 W. Addis; L.A/C. C. P. James; Sgt. J. L. Shaw.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—L.A/C. S. A. Rundle.

DIED ON ACTIVE SERVICE.—Sgt. G. Byers; Sgt. A. T. Campbell; L.A/C. W. J. Cochrane; L.A/C. R. Cox; L.A/C. R. Drake; L.A/C. P. J. Earl; Act. Flt. Lt. W. A. Hoge; A/C.2 J. Maltby; A/C.2 T. W. E. Marshall; Col. A. A. Marson; A/C.1 C. A. Reece; A/C.1 R. A. C. Rogers; Cpl. A. W. Rolfe; L.A/C. J. F. Spurr; A/C.1 E. J. Vowles.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. M. T. Byrne; Sgt. C. H. Cousins; Sgt. A. G. Dale; Sgt. J. Gorton; F/O. R. G. Houston.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. E. Croal; Flt. Sgt. J. G. Dening; Flt. Sgt. H. J. Wigley.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. N. A. Davies; Flt. Sgt. R. R. Silleock.

MISSING, BELIEVED KILLED IN ACTION.—Act. Flt. Lt. J. McD. Sullivan.

MISSING.—Flt. Sgt. A. S. Dodson; Sgt. J. E. Duff; Flt. Sgt. W. E. Fitzgerald; Flt. Sgt. L. C. Fitzner; F/O. M. R. Good; Flt. Sgt. R. H. Hallam; P/O. L. J. Haymes; P/O. L. B. Hocking; P/O. W. G. Hurle; Flt. Sgt. T. J. Jones; Flt. Sgt. B. Kerlin; Flt. Sgt. A. F. Loxton; P/O. F. G. McIntyre; Flt. Sgt. D. P. R. Schubert; F/O. H. F. Symons; Flt. Sgt. C. W. Taylor; Flt. Sgt. L. Treloar; Flt. Sgt. J. E. Walden; P/O. H. R. Vincent.

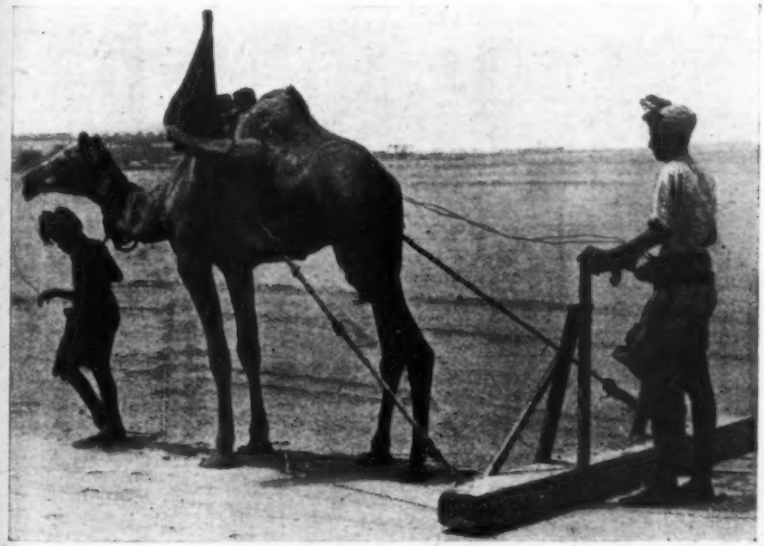
KILLED ON ACTIVE SERVICE.—Sgt. J. C. Tucker.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. W. Shapcott.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—P/O. C. O'Connell; Act. Flt. Lt. H. D. M. Ransome, D.F.C.

Royal Canadian Air Force

KILLED IN ACTION.—F/O. J. P. Custance; Sgt. D. F. Newcombe; Sgt. P. V. O'Brien.



TAKING OUT THE HUMP: A camel grader at work on an airfield at Aden, Southern Arabia.

SERVICE AVIATION

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. F. L. Darlington; Sgt. J. E. S. Sasseville; Sgt. W. McB. J. Stark.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. F. J. Belanger; Flt. Sgt. R. P. Campbell; Sgt. B. A. W. Coutts; Sgt. M. R. Crocker; Sgt. R. Dempsay; F/O. E. J. F. Dunand; Flt. Sgt. H. G. Dyer; Flt. Sgt. G. F. Fargher; Sgt. E. F. Fournier; Flt. Sgt. G. J. Hutchinson; Sgt. E. C. Lawrence; Flt. Sgt. H. M. Magder; Flt. Sgt. D. H. Watt.

WOUNDED OR INJURED IN ACTION.—F/O. J. B. Pringle.

MISSING, BELIEVED KILLED IN ACTION.—W/O. E. A. McD. Grange; F/O. L. P. Therlault; P/O. C. W. Webb.

MISSING.—Sgt. L. M. Banks; Sgt. J. A. Box; Sgt. W. J. Breen; Sgt. J. G. Brislan; Sgt. C. B. Cahill; Sgt. W. L. Cogger; Flt. Sgt. W. Craig; P/O. T. Dos Santos; Act. Flt. Lt. G. W. N. Fanson; Sgt. R. A. Fraser; Sgt. W. E. Hogarth; P/O. M. W. Howard; P/O. L. W. Kerr; Flt. Sgt. F. H. Leaver; Flt. Sgt. J. A. Leighton; Sgt. T. B. Lifman; Flt. Sgt. A. C. McLenahan; Sgt. D. J. McNeill; Sgt. E. R. Marks; Act. Flt. Lt. F. P. Marsh, D.F.C.; Sgt. E. Munsterman; Sgt. M. B. Murphy; F/O. D. H. Orr; P/O. F. W. R. Parlee; Sgt. L. C. Patrick; Sgt. C. P. Pierce; Sgt. H. C. Pithie; Sgt. J. Robertson; Sgt. J. F. Sheridan; P/O. H. M. Smith; F/O. F. P. Wilson; Sgt. C. H. Witheridge; Sgt. S. G. Young.

WOUNDED OR INJURED ON ACTIVE SERVICE.—P/O. G. E. Vance.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Sgt. A. G. McKenzie.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Flt. Sgt. K. T. P. Allan.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. F. J. Franklin.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. L. E. Bell; Flt. Sgt. E. A. Sisson; Sgt. G. C. Wilson; Sgt. K. H. Yeoman.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—F/O. E. W. Barr.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. P. D. Sim; Flt Sgt. T. A. Wilson.

MISSING.—Flt. Sgt. J. L. Hendry.

South African Air Force

KILLED ON ACTIVE SERVICE.—Flt. Sgt. J. F. Blair; Act. Sgt. B. Phelan; 2/Lt. J. Robinson; Lt. J. B. Yeats.

Royal Air Force

Casualty Communiqué No. 299.

Of the names in this list 101 are second entries giving later information of casualties published in earlier lists.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. J. L. Charlton; Sgt. H. T. Cheetham; Sgt. H. Clarkson; W/O. H. R. Cox; F/O. T. H. Follett; Sgt. G. Gray; Sgt. K. Holmes; Flt. Lt. C. L. Johnson; Sgt. D. Johnson; Sgt. E. Jones; P/O. G. B. H. King; Sgt. F. H. Lukey; Sgt. J. Nicholson; Sgt. J. B. Robertson; Sgt. D. Sims; Sgt. F. R. Thompson; Flt. Sgt. T. A. Vaux; Flt. Sgt. B. J. Ward; Sgt. R. E. Webb; Sgt. S. F. Wells.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. D. Buchanan; Flt. Lt. A. R. Chaplin; Sgt. F. P. Crawford; P/O. J. Dickinson; Sgt. J. J. Gadd; Sgt. L. J. Gait; Sgt. J. Gallimore; Sgt. J. H. Harris; Sgt. D G. Heath; Sgt. H. E. Hendon; Sgt. C. N. Judd; F/O. F. R. Leonard; Sgt. R. T. Luepke; Flt. Sgt. G. McD. MacKinnon; P/O. B. E. Morgan; Sqn. Ldr. E. D. J. Parker, G.C., D.F.C.; Sgt. C. G. Parr; Sgt. H. Pateman; Sgt. P. H. Pearce; Sgt. D. T. Pitman, D.F.M.; Sgt. E. T. Port; P/O. F. A. Read, D.F.C.; Flt. Sgt. H. A. Roberts; Sgt. R. Sawyer; Sgt. A. E. Sedin; Sgt. J. Slater; Sgt. J. E. Smith; Sgt. F. W. Stanners; F/O. L. E. Stockwell; Sgt. C. R. Steward; P/O. M. R. Symonds; Sgt. K. A. Wait; Flt. Sgt. J. D. Walls; Sgt. E. C. Webb; Sgt. W. F. R. Webb.

MISSING, BELIEVED KILLED IN ACTION.—F/O. S. A. Baldwin; Sgt. W. H. Buffery; Sgt. M. Jones; Sgt. C. Lafford; Sgt. A. C. Marsh; F/O. G. S. M. Pearson; F/O. A. J. Perkins; Sgt. R. B. Perry; P/O. P. R. Raggett; Sgt. J. A. Walls; Sgt. V. Webster; Sgt. N. Wilbraham; Flt. Sgt. D. S. Wood.

MISSING.—F/O. G. F. Alderdice; P/O. C. Armstrong; Sgt. W. J. Barriskill; Sgt. E. T. Barry; F/O. L. Bays; Flt. Sgt. H. J. Beake; Sgt. J. Binnie; F/O. C. B. L. Bodger; F/O. S. C. H. Bone; Sgt. A. P. Bowker; Sgt. H. Bradley; Sgt. J. A. Bright; Sgt. K. F. Bristow; Sgt. B. J. W. Brown; Flt. Sgt. C. MacD. Brown; Sgt. D. Brown; Sgt. W. Brown; P/O. J Burdon; Sgt. R. F. Carpenter; Sgt. P. A. R. Chauncey; Sgt. G. E. Clark; Sgt. D. J. Collins; Sgt. L. G. Croft; Sgt. T. Davis; Sgt. A. Dewar; Sgt. A. Dixon; Sgt. D. Easton; F/O. E. Filmer; Sgt. R. E. Fincham; Sgt. W. H. Ford; Sgt. A. W. G. Fox; Sgt. W. Garner; Sgt. M. Germau; Sgt. P. A. J. Gore; Sgt. T. Graham; Flt. Sgt. T. H. Greaves; Sgt. W. Green; P/O. H. Halkier; Sgt. K. Hall; Sgt. H. V. Hawkins; Flt. Sgt. W. E. Hogan; Sgt. F. G. Holmes; Sgt. R. J. Holmes; Sgt. H. W. L. Houghton; F/O. W. Hughes; Sgt. C. E. Joel; Sgt. M. R. W. King; Sgt. S. A. King; Sgt. S. W. Knight; Sgt. D. A. Lloyd; Sgt. D. K. Lovesey; P/O. A. McIntyre; Sgt. A. V. Meads; Sgt. A. R. Moffatt; Sgt. D. G. Morrison; Sgt. J. Mullin; Sgt. B. Murphy; Sgt. J. A. T. Newton; Flt. Sgt. W. R. Pallister; Sgt. C. H. Pullum; Sgt. L. H. Scholey; Sgt. R. D. Schwardt; Sgt. W. L. Scott; Sgt. W. A. Sewell; F/O. P. Shepherd-Smith; Flt. Sgt. F. A. Sherrington; P/O. J. O. Shone; Sgt. C. P. Southcott; Sgt. A. Sunley; Flt. Sgt. G. H. Sutton; F/O. H. L. Temple; Sgt. D. W. Thirsk; Sgt R. C. Walton; Sgt. C. W. C. Waters; Sgt. F. F. West; Sgt. W. H. Wheatley; Sgt. P. Williams; F/O. F. L. Yates.

KILLED ON ACTIVE SERVICE.—F/O. R. P. Abbey; Sgt. B. Bradshaw; P/O. S. J. Christophersen; A/C.2 R. W. Cooper; Sgt. J. Dabbs; Sgt. J. B. Davis; Flt. Sgt. T. S. Heyes; Sgt. G. Jones; Sgt. J. D. Lofthouse; Flt. Sgt. F. R. Morris; Sgt. S. L. Noakes; Flt. Sgt. D. L. Oates; Sgt D. Oliver; Sgt. E. P. Orchard; Sgt. R. W. Poole; Sgt. G. H. Riley; Sgt. S. Robertson; Sgt. G. V. Sigwart; Sgt. J. H. Stevens; Sgt. A. McL. Stirling; Sgt. E. Taylor; Sgt. P. C. W. Wyatt.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. J. Orrell; Sgt. H. J. Thorn.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. H. Bispham; F/O. J. P. Fraser; Act. Flt. Lt. R. L. Moss; Sgt. R. A. H. Russ; P/O. G. Smith; P/O. A. H. Vernon; Sgt. K. O. White.

WOUNDED OR INJURED ON ACTIVE SERVICE.—P/O. L. J. Gilbert; Flt. Sgt. G. P. Jupp.

DIED ON ACTIVE SERVICE.—A/C.1 J. A. H. Bascombe; Act. Flt. Sgt. V. H. Benfield; Sgt. T. W. Blundell; L.A/C. W. G. Bryant; Cpl. E. W. Carpenter; A/C.2 J. R. Cousin; L.A/C. J. Darrock; Flt. Sgt. S. J. Fox; Sgt. E. D. Francis; A/C.2 P. Gale; A/C.1 P. T. Godfrey; Cpl. W. Hodkin; A/C.1 J. McCann; Cpl. R. G. Northam; A/C.2 A. C. O'Donnell; Flt. Sgt. R. D. Osborne; A/C.2 J. E. Powell; L.A/C. H. Rudge; Cpl. C. R. Samwell; A/C.2 R. A. Sandiford; L.A/C. H. Smith; A/C.2 E. H. Stripp; A/C.1 S. M. Stubbs; L.A/C. R. M. Taylor.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. R. J. Avann; Sgt. J. F. Hughes; Sgt. W. V. Morris; Sgt. J. Parr.

Royal Australian Air Force

KILLED IN ACTION.—Flt. Sgt. R. V. Woolhouse.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. K. C. Bee.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. G. H. Cameron; F/O. A. E. H. Tonkin.

MISSING.—P/O. J. L. Carrington; Flt. Sgt. R. A. Ellis; P/O. P. M. Goldsmith; Sgt. C. C. O. Hellyer; Flt. Sgt. J. R. Ivory; Sgt. J. E. Paterson; Flt. Sgt. R. W. Richards; Sgt. F. J. Ross; Flt. Sgt. E. R. Smart; Sgt. D. H. Smith; Flt. Sgt. N. Spalding; Flt Sgt. V. G. Stabell; Sgt. R. S. Veale.

KILLED ON ACTIVE SERVICE.—Sgt. F. Meres.

Royal Canadian Air Force

KILLED IN ACTION.—Sgt. C. A. Reist.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Wing Cdr. S. S. Blanchard; F/O. G. J. Cory; Flt. Sgt. F. C. Duncan; Flt. Sgt. J. H. Eveline; P/O. P. W. Jeanneret; Sgt. A. Longwell; Flt. Sgt. W. F. Topping; Flt. Sgt. K. W. Tutton.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. R. G. Caldwell; Sgt. A. D. Cherkinsky; Flt. Sgt. A. McK. Dickie; Sgt. J. Fearnside; P/O. E. A. N. Foster; F/O. A. N. Jarvis; Flt. Sgt. S. Jeffries; Sgt. A. P. Larson; P/O. H. B. Minnis; Flt. Sgt. L. A. Parker; P/O. I. F. Preston.

MISSING, BELIEVED KILLED IN ACTION.—P/O. R. E. Clark; Sgt. T. J. Driscoll; Sgt. D. A. Wood.

MISSING.—Sgt. J. M. Batterton; Sgt. F. J. D. Brady; Sgt. E. D. Brokenshire; F/O. C. G. Bruton; P/O. C. C. Darling; Sgt. W. D. de Molitor; Sgt. J. L. Fletcher; F/O. T. R. Hoffman; Sgt. J. O. Jerome; P/O. E. B. Kirkham; F/O. M. T. Ludlow; Sgt. A. S. MacLaren; Sgt. O. M. McIntyre; Sgt. M. G. McKibbon; Sgt. H. U. Morris; Sgt. W. B. Ness; Sgt. G. F. Parker; Sgt. L. F. Power; F/O. E. G Prest; Sgt. J. H. Renaud; Sgt. D. R. See; Sgt. C. R. Smyth; Sgt. F. A. Thompson; Sgt. J. L. Troman; F/O. C. A. Wright.

KILLED ON ACTIVE SERVICE.—Sgt. J. W. Cumming; P/O. P. M. Hetherington; Sgt. W. G. Hill; Sgt. E. A. Loppe; Sgt. D. M. Martin; Flt. Lt. W. J. Smith; Sgt. H. D. Tushingham.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Flt. Lt. J. P. Calder; F/O. D. H. Crumb.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—F/O. D. R. Bannerman; Flt. Sgt. G. K. Ross; Sgt. R. J. Steed.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. A. F. Badcock; Flt. Sgt. L. D. Clark; Sgt. R. T. Cottrell; Flt. Sgt. D. D. MacLean; F/O. T. D. G. Murray; Sgt. N. A. Plummer; Sgt. E. Waters.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. W. Andrew.

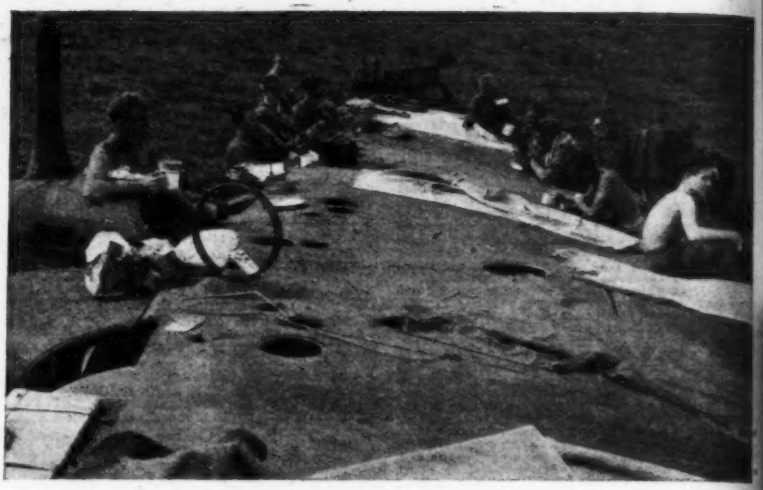
South African Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Lt. T. A. Simpson.

Official Correction

Casualty Communiqué No. 281.

Under "WOUNDED OR INJURED IN ACTION," for W/O. J. A. S. Allen read W/O. J. A. S. Allen, D.F.M.



A DORNIER IN A MESS: Anti-aircraft gunners take breakfast on the wing of a derelict Do 17 at Capodichino, near Naples.

1943

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Cameron;

gt. R. A.
C. O.
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J. Ross;
Flt. Sgt.
gt. R. S.

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L. A.

N.—P/O.
A. Wood.
F. J. D.
G. Bru-
Molitor;
an; Sgt.
D. M. T.
M. McIn-
Morris;
t. L. F.
Renaud;
t. F. A.
Wright.
W. Cum-
G. Hill;
Flt. Lt.

RVICE.—
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Force

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S. Allen,